VOLATILE ORGANIC COMPOUNDS IN THE CLASSROOM FACULTY OF SCIENCE AND TECHNOLOGY SUAN SUNANDHA RAJABHAT UNIVERSITY

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ABSTRACT

The objective of this research was to measure the concentration of volatile organic compounds (VOCs) that contaminated in the two classrooms (lecture room and laboratory) at faculty of science and technology, Suan Sunandha Rajabhat University, Bangkok, Thailand. All sampling were collect by activated charcoal tube and analyzed by gas chromatography (GC/FID). The result found two volatile organic compounds: benzene and acetone. In the lecture room the average concentration of benzene in the morning and afternoon were 0.0236 and 0.0240 ppm, respectively. The average concentration of acetone in the morning and afternoon were 8.0822 and 8.7803 ppm, respectively. The science laboratory room the concentration of benzene in the morning and afternoon were 0.0254 and 0.0242 ppm, respectively and the average acetone concentration in the morning and afternoon were 8.4515 and 9.7679 ppm, respectively.

Keywords: Volatile organic compounds, benzene, acetone

1. INTRODUCTION

Indoor air pollution is the accumulation of contaminants that have a certain level of concentration in the air for a prolonged period of time, which can be harmful to the health of the occupants. Indoor air pollutant was found in buildings may be classified as substances that cause indoor air quality problems. If there is a high level of concentration that may disturb or affect the health of the people living in the building, these substances are many types and remain in the air. The three states are solids, liquids and gases. Solids in the form of particles Suspension in the air, such as dust and liquid fumes, in the form of particles of liquid suspended in the air, is a gas mist in the form of vapors and gases. It is based on modern building materials and modern activities [1].

In some workplaces, employees experienced high rates of abnormal headache, nausea, and nasal congestion. Irritations of the throat and eyes. Feeling tired, with fever, muscle aches. Dizziness and dry skin. These symptoms occur during work hours and usually improve after the person leaves the workplace, which describes these conditions. Sick Building Syndrome (SBS) Symptoms caused by working in the building. The cause of the abnormalities of SBS is not known, but may be caused by volatile organic compounds. SBS may also be caused by increased stress levels and heavy workload or mental state [2] by the World Health Organization (WHO). It is estimated that 30% of buildings worldwide may have indoor air quality problems that could lead to Sick Building Syndrome (SBS). Becket signs of this happening. There are no specific symptoms that are not different from symptoms of allergies or flu, such as eye irritation. Respiratory tract irritation, nasal congestion, dry eyes, dyspnoea, chest tightness, headache, numbness and skin irritation, etc. [3].

Research conducted on volatile organic compounds in indoor air. There are 15 volatile organic compounds in 17 buildings in Bangkok. Volatile organic compounds were found to be the highest in the sampled buildings, Toluene (110 mg/m^3), followed by Limonene (60.5 mg/m^3). The four chlorine compounds were measured. The concentration of all organic substances in the building was significantly higher than in the outside of the building at the 0.05 level, except for chlorinated compounds such as tetrachloroethylene, 1, 2-dichloroethane And 1, 2-dichloropropane Compared with study abroad, it was found that Concentrations of Benzene, Xylene and Styrene are similar in concentrations to buildings in Hong Kong, Korea, India, England, Finland, and the United States. The concentration of Toluene and Limonene is higher than in other countries [4].

The Faculty of Science and Technology There are a number of school buildings, which have recently opened a new school building and a long-lived building. In some classes, there may be bad weather. Students are exposed to air pollutants in the classroom. The quality of air in the classroom is important because in the classroom or in the student building, there are a lot of students on a daily basis if students are exposed to pollutants in the air in the classroom. Problems affecting the health of students.

This study Volatile Organic Compounds (VOCs) were studied in the classroom of the Faculty of Science and Technology. Suan Sunandha Rajabhat University Compared between classroom lecture and science laboratory. The difference is that they represent the volatile organic compounds. It is possible to find contaminants in the air. It is also an area that students use to study quite. Comparing the results of two types of air quality measurements in the classroom.

2. OBJECTIVES

1. To measure the amount of volatile organic compounds that are contaminated in the air within the classroom of the Faculty of Science and Technology. Suan Sunandha Rajabhat University

2. To study the comparison of volatile organic compounds contaminated in air by the characteristics of the classroom within the Faculty of Science and Technology. Suan Sunandha Rajabhat University

3. METHODS

A. Tools and Equipment

(1) Air sampler
(2) Dry Gas Meter (DGMs) for measuring the air flow rate.
(3) Coconut shell charcoal tube
(4) As Chromatography using Flame Ionization Detector (FID) (Shimadzu GC-2010)

B. Operating procedures

Study of volatile organic compounds in the classroom. Faculty of Science and Technology Suan Sunandha Rajabhat University is a lecture room and science laboratory. Sixty Samples were collected by a Coconut Shell Charcoal Tube and analyzed by gas chromatography / flame ionization detector (GC / FID) [5]. Stained in the air inside the classroom comparison of volatile organic compounds in air in the classroom. This is the lowest value, the highest, the average, the standard deviation. The percentage of volatile organic compounds Statistical analysis Variance analysis to compare volatile organic compounds in the classroom. At a significant level of 0.05.

4. RESULTS

This research found 2 volatile organic compounds in two rooms are lecture room and science laboratory include benzene and acetone. The concentration of benzene and acetone were shown in table 1 – 2.

A. The lecture room

In the morning, from the table 1 and figure 1 – 2, the benzene concentration was 0.0047 – 0.0519 ppm and the average was 0.036 ± 0.0124 ppm. The acetone concentration was 0.4795 – 12.7267 ppm and the average was 8.0822 ± 3.2867 ppm.

In the afternoon, from the table 1 and figure 1 – 2, the benzene concentration was 0.0119 – 0.0567 ppm and the average was 0.0240 ± 0.0101 ppm. The acetone concentration was 1.0078 – 14.1000 ppm and the average was 8.7803 ± 3.2011 ppm.

From the result we found that all samples, the benzene and acetone concentration were less than the standard (in the indoor air quality, benzene not exceeding 2.5 ppm and acetone less than 750 ppm).

Table 1. The concentration of benzene and acetone in the lecture room

Sampling date	Benzene (ppm)		Acetone (ppm)	
	Morning	Afternoon	Morning	Afternoon
Nov 30, 2015	0.0167	0.0098	9.0354	7.5946
Dec 1, 2015	0.0173	0.0158	6.7799	4.0628
Dec 2, 2015	0.0177	0.0192	7.3348	8.2438
Dec 3, 2015	0.0205	0.0302	5.9543	1.0078
Dec 3, 2015	0.0058	0.0119	5.6836	5.5568
Dec 8, 2015	0.0141	0.0171	6.5030	8.2887
Dec 9, 2015	0.0470	0.0361	6.9333	13.8597
Dec 11, 2015	0.0047	0.0222	7.4985	9.9976
Dec 14, 2015	0.0232	0.0231	11.2548	10.4083
Dec 15, 2015	0.0154	0.0567	8.9336	4.7974
Dec 16, 2015	0.0183	0.0191	9.6185	8.7163
Dec 17, 2015	0.0330	0.0185	11.5857	8.1795
Dec 18, 2015	0.0196	0.0276	9.1688	14.1000
Dec 21, 2015	0.0278	0.0152	12.7268	6.4955
Dec 22, 2015	0.0426	0.0216	0.4795	10.3726
Dec 23, 2015	0.0206	0.0225	10.1587	9.5375
Dec 24, 2015	0.0120	0.0233	6.7698	10.5842
Dec 25, 2015	0.0519	0.0340	0.7423	9.4927
Dec 28, 2015	0.0246	0.0223	8.3927	8.7813
Dec 29, 2015	0.0317	0.0312	11.6390	12.7140
Dec 30, 2015	0.0316	0.0263	12.5337	11.5942

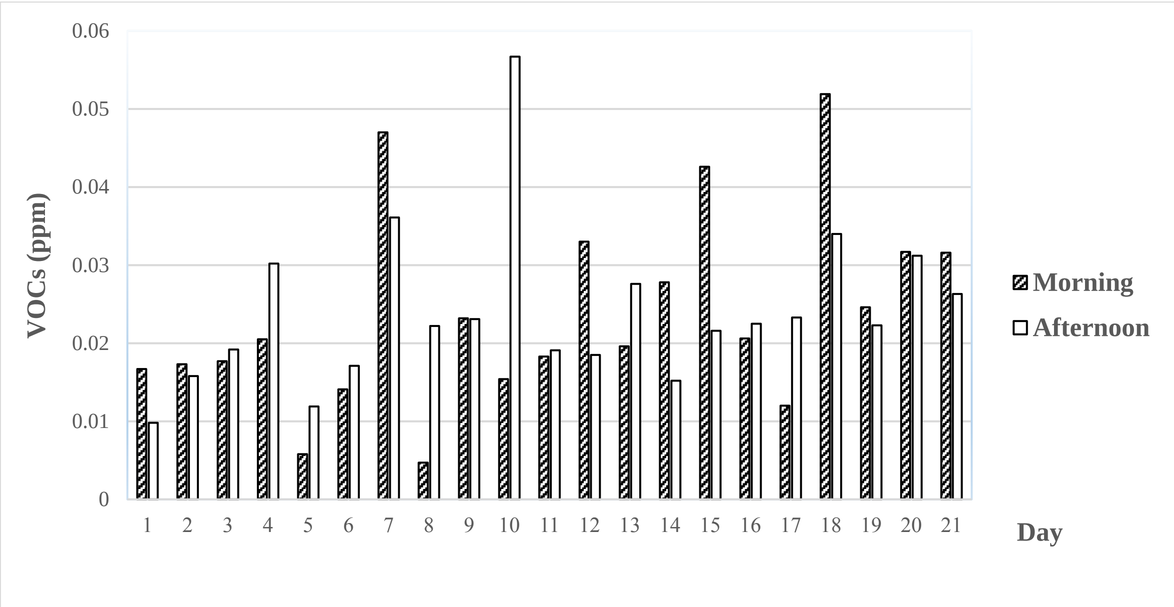

Figure 1. Benzene Content in Classroom Lecture

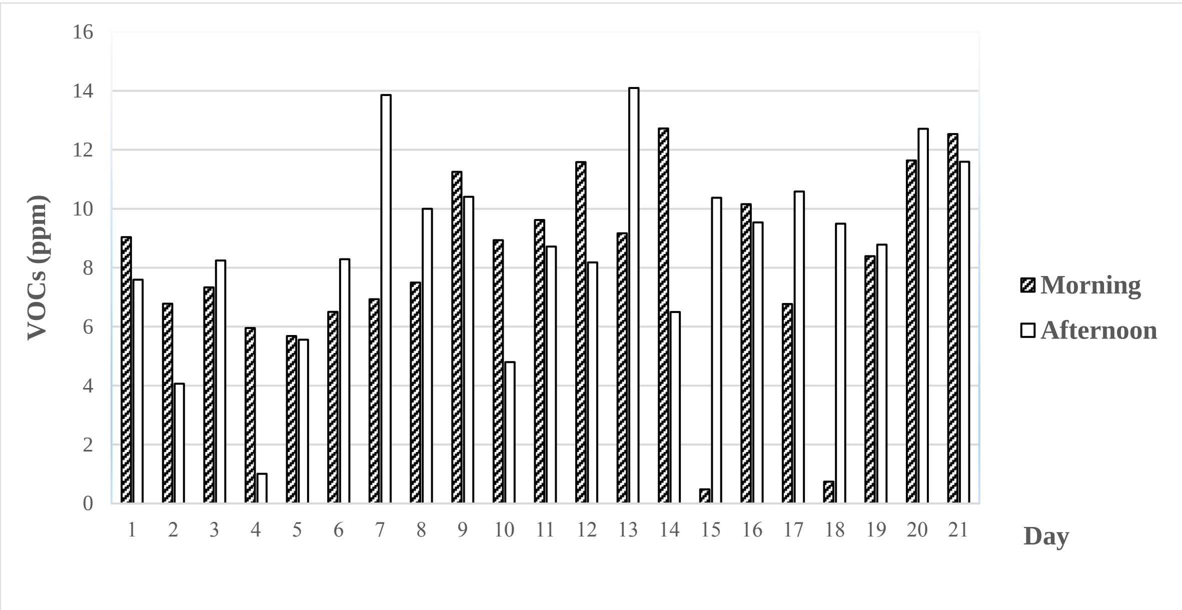

Figure 2. Acetone Content in Classroom Lecture

B. The science laboratory room

In the morning, from the table 2 and figure 3 – 4, the benzene concentration was 0.0108 – 0.0682 ppm and the average was 0.0254 ± 0.0126 ppm. The acetone concentration was 1.5558 – 16.9607 ppm and the average was 8.4515 ± 3.5359 ppm.

In the afternoon, from the table 2 and figure 3 – 4, the benzene concentration was 0.0119 – 0.0567 ppm and the average was 0.0240 ± 0.0101 ppm. The acetone concentration was 1.9174 – 16.3914 ppm and the average was 9.7679 ± 3.7137 ppm.

From the result we found that all samples, the benzene and acetone concentration were less than the standard (in the indoor air quality, benzene not exceeding 2.5 ppm and acetone less than 750 ppm).

Table 2. Contamination of Benzene and Acetone in a Science Laboratory

Sampling date	Benzene (ppm)		Acetone (ppm)	
	Morning	Afternoon	Morning	Afternoon
Nov 30, 2015	0.0192	0.0220	8.9739	6.8532
Dec 1, 2015	0.0197	0.0341	8.8960	1.9174
Dec 2, 2015	0.0312	0.0131	3.3323	7.3439
Dec 3, 2015	0.0462	0.0161	3.2020	9.0846
Dec 3, 2015	0.0108	0.0231	6.4240	8.5118
Dec 8, 2015	0.0133	0.0209	8.0211	7.9997
Dec 9, 2015	0.0317	0.0105	7.1788	7.4648
Dec 11, 2015	0.0182	0.0138	8.2228	7.9430
Dec 14, 2015	0.0242	0.0430	9.2449	2.9921
Dec 15, 2015	0.0242	0.0227	11.3965	9.4781
Dec 16, 2015	0.0165	0.0323	10.0394	13.0366
Dec 17, 2015	0.0173	0.0256	1.5558	12.9348
Dec 18, 2015	0.0183	0.0294	9.5866	14.6083
Dec 21, 2015	0.0227	0.0288	10.0767	16.3914
Dec 22, 2015	0.0184	0.0216	8.9055	15.5739
Dec 23, 2015	0.0236	0.0361	10.7349	11.4831
Dec 24, 2015	0.0682	0.0185	2.7854	8.3006
Dec 25, 2015	0.0329	0.0225	11.3835	10.1812
Dec 28, 2015	0.0223	0.0285	9.4627	13.3648
Dec 29, 2015	0.0316	0.0202	16.9607	9.6088
Dec 30, 2015	0.0229	0.0258	11.0974	10.0536

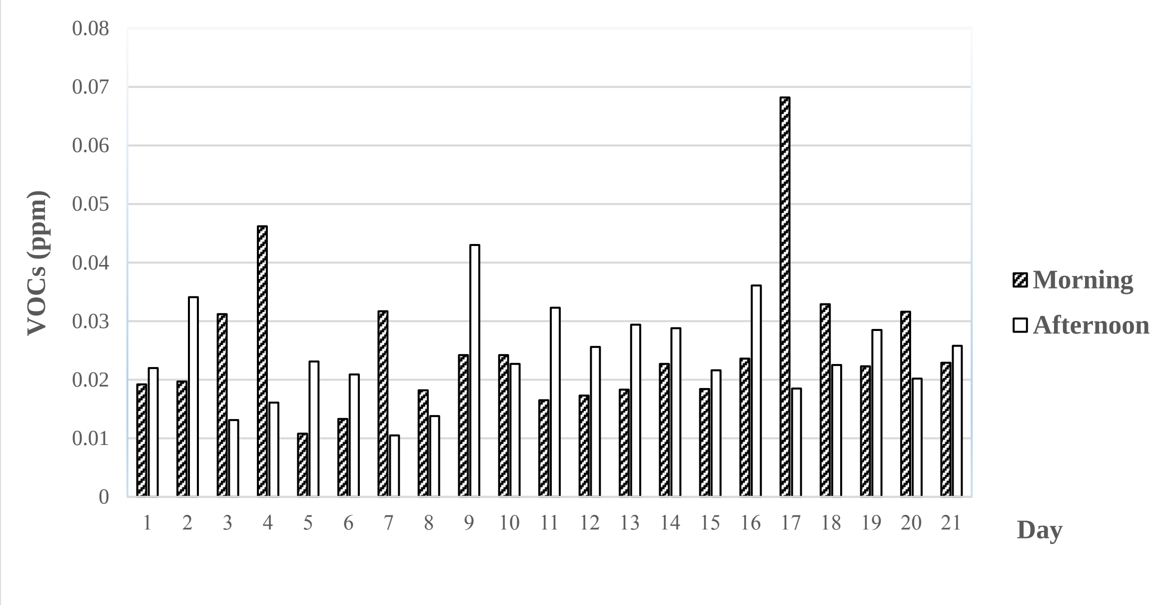

Figure 3. Benzene concentration in science laboratory

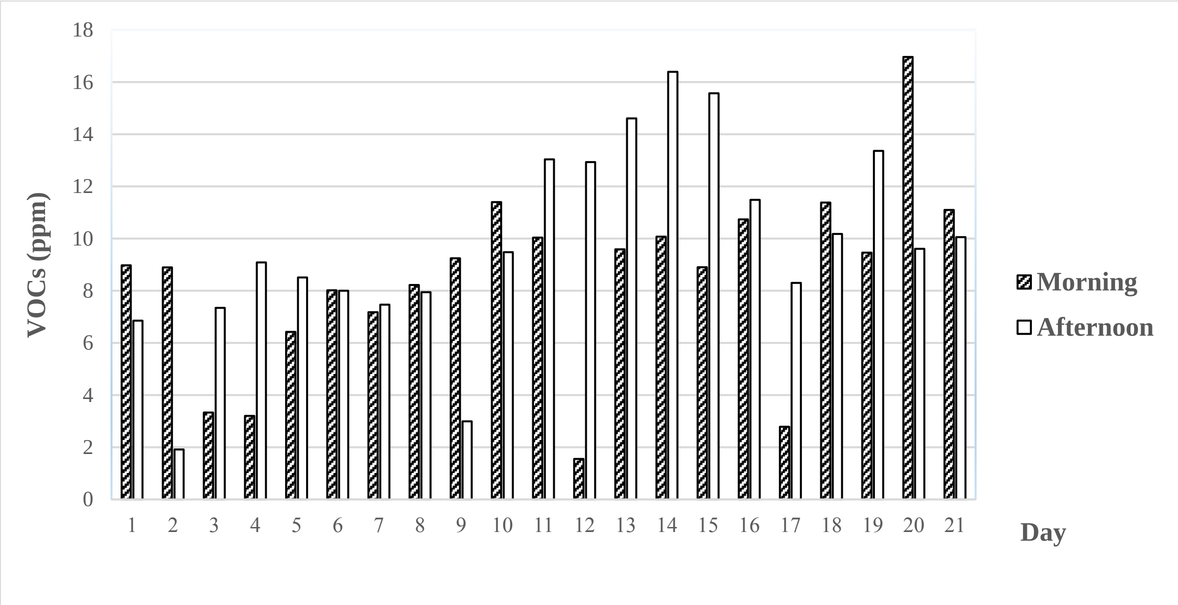

Figure 4. Acetone concentration in science laboratory

C. The Statistic analysis

The comparison of benzene an acetone concentration of the two classrooms in the morning not differences (Sig. = 0.660, 0.986 respectively). In the afternoon, the benzene concentration of the two classrooms not differences (Sig = 0.992, 0.831 respective)

5. CONCLUSION AND FUTURE WORK

This study aims to measure the amount of volatile organic compounds contaminated in the air in the classroom of the Faculty of Science and Technology, Suan Sunandha Rajabhat University and to compare the volatile organic compounds content in the air by the characteristics of the classroom within the Faculty of

Science and Technology, Suan Sunandha Rajabhat University the research found that the study found two volatile organic compounds benzene and acetone. The class of benzene concentrations in morning and afternoon were 0.0236 and 0.0240 ppm respectively. The acetone content in the morning and the afternoon was 8.0822 and 8.7803 ppm respectively. The concentration of benzene in morning and afternoon was 0.0254 and 0.0242 ppm respectively. The acetone content in the morning and the afternoon was 8.4515 and 9.7679 ppm, respectively.

6. ACKNOWLEDGEMENT

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A COMPARISON OF STUDENT ACHIVEMENT AND SCIENTIFIC ATTITUDE IN FUNDAMENTAL PHYSICS OF 1st YEAR STUDENTS, SUAN SUNANDHA RAJABHAT UNIVERSITY BETWEEN USING 5Es APPICATION AND IPST MODEL

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ABSTRACT

The purposes of this study were 1) to compare student achievement of 1st year students, Suan Sunandha Rajabhat University (SSRU) in Physics subject on the topic "Newton's laws" between groups using 5Es with application model and IPST Model. 2) to compare Scientific attitude in Physics subject on the topic "Newton's laws" between groups using 5Es with applications model and IPST Model. The samples used in this study are the of 1st year students, SSRU. A total of 2 classroom or 2 groups of 1st year students were tested during the second semester, in academic year 2017.

The results should that.

1. The 1st year student achievement of Suan Sunandha Rajabhat University in Physics subject on the topic "Newton's laws" between groups using 5Es with application model and IPST Model. was different in the statistically significant at .05 level

2. The Scientific attitude in Physics subject on the topic "Newton's laws" between groups using 5Es with application model and IPST Model. was different in the statistically significant at .05 level

Keywords: 5Es with application model, Scientific attitude, Student Achievement

1. INTRODUCTION

Physics, which is the basic of many sciences. Theories and knowledge of physics can be applied to other disciplines. It is a problem in learning management, which is the subject of the abstract, so it is difficult to understand. Teaching science is important in helping students understand the basic principles. Most physics courses focus on solving problems rather than absorbing them. Main concepts or concepts in physics

Fundamentals of Physics Teachers need to find techniques to learn how to help. Encourage students to understand the content of the course. Make better learning achievement.

5Es with application model has been developed by Wichan Lertlop is based on the theories of Piaget's intellectual development and knowledge creation theory. (Constructivism), with a 7 steps is to motivate them. The discussions / hypothesize to explore / expand the experiment in order to describe the concept and the evaluation process was repeated. The format of the course will focus on the role and importance to the students to learn. According to research on the leadership style of teaching as a form to teach physics in Grade 10, the effect of higher learning, students who have been taught by some form of IPST. A. level of statistical significance. 05 (Department of excellence in May, 2543, p.114-120).

From the above, therefore, 5Es with application model or the teaching methods of Wichan Lertlop have been brought to this study. It is the curriculum emphasizing a student-centered learning for development of science achievement and attitudes of students.

2. OBJECTIVES

1. To comparison of students' achievement between teaching/learning approaches based on 5Es with applications model and IPST model.

2. To compare scientific attitude of 1st year students in physics subject on the topic "Newton's **laws**" between groups using 5Es with applications model and IPST model.

3. METHODS

The purpose of this research was conducted by a sequence of operation.

1.Population

The population in this study was a 1st year students. tested during the second semester, in academic year 2017.of over124 samples used in the research. The sample used in this study were students at Suan Sunandha Rajabhat university (SSRU) selected by random sampling two classrooms to draw into 2 groups: the experiment group of 40 was taught by 5Es with Applications model and the control group of 38 was taught by IPST model.

2.The instruments used in research

(2.1) The lesson plans which were based on 5Es with applications model about Newton's laws

(2.2) The lesson plans which were based on IPST model about Newton's laws

(2.3) Newton's laws knowledge test which the reliability using the formula KR - 20 of Kuder-Richardson is at 0.95 confidence.

(2.4) An attitude towards science which has a coefficient alpha 0.87.

3.Research Data Collection

The purpose of this research was conducted by a sequence of operation.

(3.1) The researcher who taught students in both groups: the experiment group was taught by 5Es with application model and the control group was taught by IPST model. Each model was based on 4 lessons for 6 weeks.

(3.2) Before of the lesson, we will perform the Pre- test.

(3.3) At the end of the lesson, we will perform the following test.

(3.3.1) Achievement at the end of the lesson.

(3.3.2) Attitude towards science.

Data Analysis

The data were analyzed in the following.

(1) Comparison of students's achievement between teaching/learning approaches based on 5Es with application model and IPST model. The statistic was independent sample t-test with the level of 0.05 statistical significance.

(2) Comparison of students's attitude toward science between teaching/learning approaches based on 5Es with application model and IPST model. The statistic was independent sample t-test with the level of 0.05 statistical significance.

4. RESULTS

Comparison of students' achievement between teaching/learning approaches based on 5Es with application model and IPST model. Results shown in Table 1.

Table 1. Compares the average results of the analysis of students' achievement between teaching/learning approaches based on 5Es with application model and IPST model.

Achievements cores	$\overline{X}$	**S.D.**	**t**	**Sig.**
5Es with application model	24.23	1.97	10.97*	.00
IPST model	18.39	2.67		

* level of 0.05 statistical significance.

Table 1 shows that the two groups of students who had been taught 5Es with application model and IPST model. A students' achievement was taught by 5Es with application model was different from the group that was taught by IPST model. A statistically significant at the 0.05 level. Considering the average score is found that learning 5Es application the more valuable IPST model. It shows that the achievement 5Es with application model of the students have higher achievement IPST model.

Comparison of students' attitude toward science between teaching/learning approaches based on learning Cycle with application model and IPST model. The test is shown in Table 2.

Table 2. Compares the average results students' attitude toward science between teaching/learning approaches based on 5Es with application model and IPST model.

Attitudes towards science subjects	$\overline{X}$	**S.D.**	**t**	**Sig.**
5Es with application model	4.13	0.23	10.99*	.00
IPST model	3.52	0.26		

* level of 0.05 statistical significance.

Table 2 shows that the two groups of students who had been taught by learning 5Es with application model and IPST model. Attitude toward science was taught by 5Es with application model was different from the group that was taught by IPST model. A statistically significant at the 0.05 level. Considering the average score is found that learning Cycle with application model is greater than IPST model. The study shows learning Cycle with application model gives students' attitudes towards science than IPST model.

It shows that students' attitude toward science 5Es with application model of the students have higher attitude toward science IPST model.

5. CONCLUSION

- A comparison of students' achievement between teaching/learning approaches Based 5Es with application model and IPST Model were different at a level of 0.05 significant.
- A comparison of students' attitude toward science between teaching/learning approaches Based on learning 5Es application and IPST model were different at a level of 0.05 significant.

6. DISCUSSION

(1) The results showed that the two groups of students who had been taught by 5Es with application model achieved differently from the group that was taught by IPST model. A statistical significant was at the 0.05 level. It was found that students who had been taught by 5Es with application model have higher academic achievement than students who had been taught by IPST model. This is probably due to the format of the instruction. Thinking Skills particularly solves the problem. Reflective thinking, critical Thinking And creative thinking were found as a result. Students discover or learn skills in scientific terminology. Significantly, students play a role in learning and knowledge by themselves. Is based on the idea of advanced further.

Consistent with the research of one of the Lertlop (2543, p. 114-120), the study compared the outcomes of the 5th grade students found that students who had been taught by 5Es with application model-IPST Model have higher academic achievement than students who had been taught by IPST model. The level of statistical significance was 0.01.

(2) The study found that the second group of students who have been learning of 5Es with application model have attitude toward science different from the group that received IPST model. 5Es with application model, the level of statistical significance at.05 is probably due to IPST model. Training Working Group Discussions with as well as mutual aid learning the students' self-esteem. Students are enthusiastic and interested in learning more and tend to practice self-researched facts. Unknown reason, research and resolve the issue by adopting scientific methods used in the learning process. The motivation for learning shows that students are happy and have more fun to learn. For this reason, the course follows 5Es with application model as a result, students' attitudes towards science than students who received instruction in the following IPST model.

7. ACKNOWLEDGEMENTS

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GUIDELINES FOR DEVELOPMENT OF EQUIPMENT REQUISITION SYSTEM IN FACULTY OF INDUSTRIAL TECHNOLOGY, SUAN SUNANDHA RAJABHAT UNIVERSITY

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ABSTRACT

A study on the development of a system for the distribution of material and office equipment. This work was aim obtain the database information that the guideline for application, improvement, and development for an efficiency of the equipment requisition facility system in the faculty of Industrial Technology, Suan Sunandha Rajabhat University. The research method was using the questionnaire with 10 respondents of administrators, inventory officer, and reverent officer in the faculty of Industrial Technology. The method was obtained data by using officials and questionnaires came from executive officer, material management officer, and general staff. The method was based on random sampling and Krejcie and Morgan Table. There were performed with 4 strategies for creating a crawl tool and 5 strategies for confirming quality and accuracy of content data. The index of consistency (IOC) showed an acceptable with a significant confident 0.975 for confirming these methods.

Keywords: equipment requisition system, management, information

1. INTRODUCTION

Work management in the organization requires procurement because it is a tool to help management more effective. The management of the procurement is an important task for all government departments and it is a very necessary, due to saving the budget, fast, and comfortable and real time. To be ready for procurement is effected to be successful an organization goal. If the organization miss the supplier management, it affects to get more complicated and wasting, and it would be lacked effectiveness. In addition, the management of the procurement is also supporting projects that have been planned with a fair package. To work with the project, and other tasks smoothly, it requires the cooperation of the procurement of the school management. (Getzels, J., Lipham, J. and Campbell, R. , 1968) [1] Getzels and the team said there are six of school projects:

1. The relationship between the school and the community
2. Teaching Curriculum
3. Student Affairs
4. Human Resources
5. Household Group
6. There are four parts of management in Office and Financial department (4M) as follow:
   (1) Man
   (2) Money
   (3) Materials
   (4) Management

Development of a system for the distribution of material and office equipment, it is one database system for the administration of material supplies of Faculty of Industrial Technology, Industrial Management, Suan Sunandha Rajabhat University. Currently, the material is stored in a document format, searching and storage are not organized and possible loss. Material information is important for Faculty of Industrial Technology, Industrial Management, Suan Sunandha Rajabhat University. So, it suspected the development of a system for the withdrawal of materials used in the storage of materials by using Database application technology to view watch an information at any time and place. Data can be easily updated and retrieved in many ways, such as time wastage and loss of expenses, etc.

2. OBJECTIVES

1. To study the overall distribution of material and office equipment system of Faculty of Industrial Technology, Industrial Management, Suan Sunandha Rajabhat University
2. To propose guidelines for the development of distribution of material and office equipment of Faculty of Industrial Technology, Industrial Management, Suan Sunandha Rajabhat University system of data storage, data searching, and data improvement.
3. To evaluate the efficacy and appropriation of distribution of material and office equipment of Faculty of Industrial Technology, Industrial Management, Suan Sunandha Rajabhat University system.

3. SCOPE OF THE RESEARCH

There were three parts of distribution of material and office equipment development in Faculty of Industrial Technology, Industrial Management, Suan Sunandha Rajabhat University;

1. Area scope, the studying of the overall distribution of material and office equipment system to use in Faculty of Industrial Technology, Suan Sunandha Rajabhat University.

2. System scope such as materials searching and reporting, equipment materials system update, the system of disbursement of materials, etc.

3. User scope, there were four groups; executive officer, material management officer, user, and general staff.

4. LITERATURE REVIEW

The concept of distribution of material and office equipment system is the use of software to manage the storage system for the convenience of use and able to replace the original system as well. In this research, we studied the related kinds of literature as follows:

1. Theory, Definition
2. Literature Review

<u>1. Theory, Definition</u> defines the meaning of a procurement – durable articles, the framework of the supplier management, the development and creation of information systems for use in research is called SDLC, software development typically consists of three main activities: analysis, design, and implementation. These three activities can be used to build software in accordance with the SDLC guidelines until all the activities of the system used in the development of the system are seven steps: Problem Definition, Analysis, Design, Development, Testing, Implementation, and Maintenance

<u>2. Literature Review</u> We studied the related research such as; Guidelines for Improvement of Finance and Supply Operational Management of Chiang Mai University Faculties (Suksapha, 1998) [2]; Electronics Purchasing - Procurement of Provincial Electricity Authority (Uthitasarn, 2002) [3]; Improvement of inventory process by means of a process redesign : a case study of department of foreign languages, faculty of science, Mahidol University (Pakkadtang, 2006) [4]; etc.

5. METHODS

In this study, we used the questionnaire to collect data. The research method consists of: define the target population, research tool, data collection, and data analysis. We specify the details of the research methodology are as follows:

1. Population and Samples

1.1 Population

The population for this research was the executive officer, material management officer, and general staff in Faculty of Industrial Technology, Suan Sunandha Rajabhat University for 10 people.

1.2 Sample

The sample for this research were the executive officer, material management officer, and general staff in Faculty of Industrial Technology, Suan Sunandha Rajabhat University for 10 people by using Krejcie and Morgan table (Krejcie, R. V., & Morgan, D. W. , 1970) [5] and the simple random sampling.

2. Research tools

In this study, we use the questionnaire as a research tool. The questionnaire is divided into 4 sections as follows.

Part 1 is a survey questionnaire about demographic information of the respondents, such as sex, age, education level, etc.

Part 2 is a questionnaire about overall in materials management divided to 5 parts 23 questions by 5-point Likert scales (Likert, 1932) [6].

Part 3 is a question about materials management problems divided to 7 parts 29 questions by 5-point Likert scales (Likert, 1932) [6].

Part 4 is an open-ended question about the suggestion of materials management 5 parts; Material Providing, Material Controlling, Material Storing, Material distribution, and Material Selling. That was for the respondents could give us the freedom feedback.

3. Instrumentation Find Out

The process and method of constructing the questionnaire are as follows:

3.1 The scope of the questions creation covers the factors that influence the development of the material disbursement system of Faculty of Industrial Technology, Suan Sunandha Rajabhat University.

3.2 Bring the questionnaire to 3 experts to check the quality of content accuracy by finding index of consistency (IOC).

3.3 Use the modified questionnaire to experiment with 10 non-sample groups to find reliability using the alpha coefficient, in the calculation, 0.975 confidences was the acceptable confidence.

3.4 Improving the questionnaire to be used in next time:

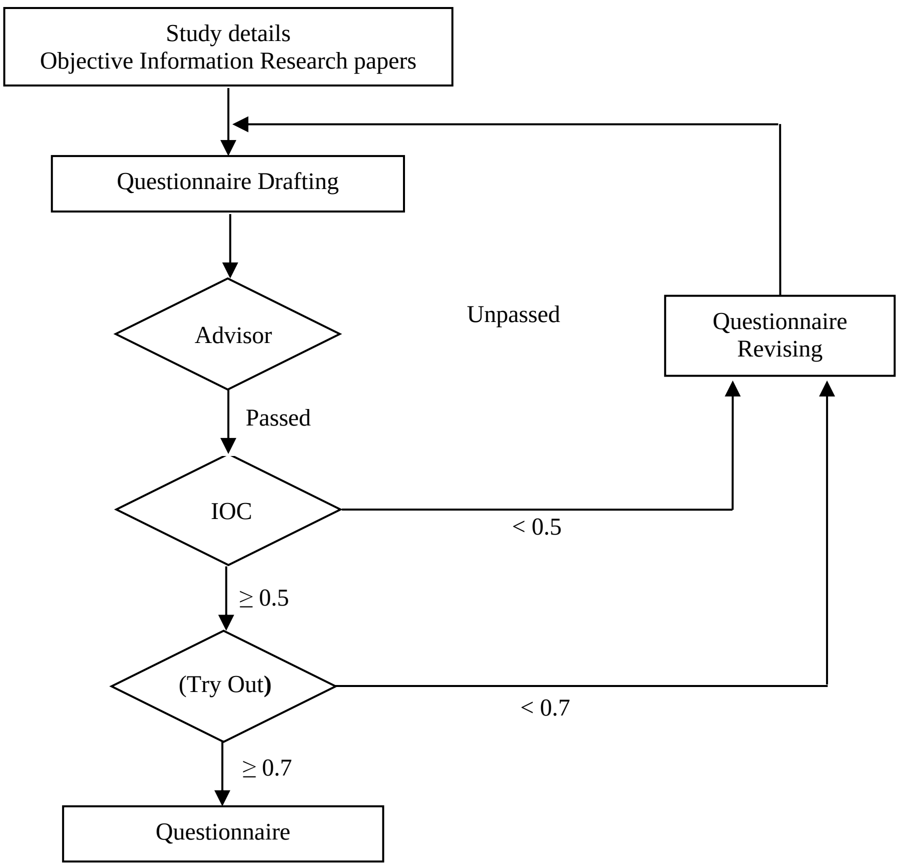

Figure 1. The procedure of instrument research

4. Data Collection

We performed various steps to collect data, the process of collecting data is as follows:

4.1 Applying for permission to collect information to distribute the questionnaire to the executive officer, material management officer, and general staff in Faculty of Industrial Technology, Suan Sunandha Rajabhat University.

4.2 The questionnaire was distributed to the sample in Faculty of Industrial Technology, Suan Sunandha Rajabhat University.

4.3 Collected the questionnaire in 1 week.

4.4 Verify the completeness and accuracy of information in the questionnaire from 10 respondents.

4.5 For the open-ended question that we required the answer should not be less than 10% of questionnaires. In total, there were 1 respondent, 10.00%.

4.6 Analysis the data from the questionnaire using computer software.

5. Data Analysis

Statistical analysis was performed using SPSS are as follows:

5.1 Information obtained from part 1 is a question about demographic information of the respondents. The data were analyzed by frequency distribution and find a percentage.

5.2 Information obtained from part 2 and part 3 were analyzed by the average ($\bar{X}$) and standard deviation (S.D.)

5.3 Part 4 was an open ended questions, it was about the suggestion of materials management 5 parts: Material Providing, Material Controlling, Material Storing, Material distribution, and Material Selling, summarized and presented by report.

5.4 Testing the hypothesis to compare the condition and problems of the job management in Suan Sunandha Rajabhat University The average test is based on the t-test, comparison between two groups, gender and one-way ANOVA. (Onaway – ANOVA). In case differences between groups of more than 2 groups such as age, education Previous page affiliated agencies and the parcel in case of significant differences at the 0.05 level, (multiple comparison) using the Scheffé method (Scheffe, 1959) [7].

6. RESULTS

This research was to study the overall of distribution of material and office equipment system in Faculty of Industrial Technology, Suan Sunandha Rajabhat University. Then develop and evaluate the efficiency and suitability. It is a way to solve the problem of the system and add data, store data, report results in the form of a database, collected full use of the information, make decisions for the workers and the management in the planning of materials disbursement of the Faculty of Industrial Technology, Suan Sunandha Rajabhat University

The research results are summarized as follows:

1. Feasibility Study

It is expected that when the development of materials technology of the Faculty of Industrial Technology, Suan Sunandha Rajabhat University finished can reduce the issue of materials, classification by type of materials, equipment, lack of regulation, scattered, saving budget and use of materials to maximize.

2. System designing

2.1 The objective is to dispense materials and database file structure from the University and the Faculty of Industrial Technology.

2.2 The design of the message database before classification into 3 parts:

(1) The conceptual database design is presented as a diagram all entities are represented. Attribute of the entity and the relationship between the entities come out in the form of a diagram that corresponds to the database management system that is used.

(2) The logical database design, after analyzing user requirements and to compile the rules by using the model database corresponding to the database system used.

(3) The physical database design, it's a design stage at the bottom. This will interfere with the actual storage of data inside a storage device such as a disk so that it can be optimized for access or search. At this stage it may be an index, the location of the data within the storage unit.

2.3 The implementation is applying different design preferences to the program considered. When done designing, program must be submitted through a step-by-step procedure to see the features and check for other errors that may occur to view performance

2.4 Creating a Manual documentation describe in detail what the purpose of the program is the program components.

3. Evaluation

3.1 An evaluation of the condition of the package management of the respondents from the sample of 10 people found that the university has set up various plans. The procurement plan is very clear. The control plan is very clear to the operator. The plan to control the number of the package is complete. The evaluation results are 40.00 to 70%.

3.2 The evaluation of seven problem-solving problems of the respondents from the sample group of 10 people encountered problems such as lack of good planning from management, wasting budget. The problem of the management of the package as a result of the management training and seminars on the administration of the procurement is insufficient. The result of the evaluation was 40.00% to 70%

7. DISCUSSION

From the research, it is found that the system of demand deviation of the equipment is at a higher level, the efficiency of the program is in accordance with the university regulations go straight to the system can be tracked and monitored easily. But charging most materials will be documented. In each disbursement, wastage of paper and voices is wasted and delays in reporting and the longer the data, the more difficult and delayed the operation. It is highly recommended to keep the information in a centralized system that all relevant personnel can monitor and easy to report.

8. SUGGESTION

The findings of the research should be suggested to be used as follows:

1. Suggestions on the use of research results

1.1 To use the equipment disbursement system once a year should check the suitability of the user.

1.2 The research has modified the system to work but some people still get used to their original behavior. It takes time to change the way you work.

1.3 The use of the university's resource disbursement system also needs to be linked to external organizations, such as the Comptroller of the State. The program updates must be centralized as well.

2. Suggestions for the next research

After the implementation of the material disbursement system, there are other issues that need to be developed.

2.1 It should be added to the online database so that relevant personnel can access or monitor and monitor it anytime, anywhere.

2.2 The data should be analyzed to graph such as material disbursement data.

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A STUDY OF MEDIA PERCEPTION IN RECRUITING STUDENTS OF SUAN SUNANDHA RAJABHAT UNIVERSITY

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ABSTRACT

Globalization is a world where human beings can cross national borders and pass through time. By using information technology to communicate in a borderless manner. The world in the eyes of those who rely on technology. The world is small and easy to contact each other. Rapid change in all dimensions, both social, economic, political and technological, as a result of the development of information technology. And change the structure of the global political economy. The result is different countries. The world has to rely on each other. And there are more interconnected. The world has been vastly smaller. Each remote country can be contacted in seconds, as a village (Global Village), mountain and sea, a natural border. This is a great way to get in touch. As a result, Suan Sunandha Rajabhat University has set up a public relations strategy to create image in response to the strategy. The focus of the news of the movement of Suan Sunandha Rajabhat University. And recruit new students each academic year. The public relations through the media to study media perception in recruiting new students to study in Suan Sunandha Rajabhat University. This is a guide to the development of various media. To recruit new students of Suan Sunandha Rajabhat University.

The sample was selected from a group of new undergraduate students from Suan Sunandha Rajabhat University. Sampling and convenience sampling with 95% confidence intervals and 5% expectation were used. The samples were 300 samples.

Media types that receive regular news. Most of the students received news from the website, 61.6%, followed by television with 51.0%, and the lowest was the document that sent the message to the media, representing 10.0%

The source of information for admission to study in Suan Sunandha Rajabhat University. Most students receive information on the website. www.ssru.ac.th Most of them were 65.6%, followed by education counselors (37.6%), and least radio users (11%).

Recruit new students to study in Suan Sunandha Rajabhat University It was found that the media type of perception of the media was at a moderate level. The most popular is Internet. The second is media perception. And the least is. Media awareness

Keywords: Student Recruitment, public relations

1. INTRODUCTION

Suan Sunandha Rajabhat University has set up public relations strategy to create image in response to the strategy. The focus of the news of the movement of Suan Sunandha Rajabhat University. And recruit new students each academic year. The public relations through media such as television, radio, newspapers, social media. It is necessary to perform regularly to maximize benefits. It must be prepared in every capacity. By following the strategy laid out. One of them is Public relations Especially good corporate image. This will result in a target audience. And the general public understand the acceptance, confidence, and support of Suan Sunandha Rajabhat University in various fields. Enhancing the management and competition as well. The operation must be under the strategy of Suan Sunandha Rajabhat University in order to maximize the efficiency of public relations. So if we can promote the news continuously. And reach the target as well. It will be a way to help the effectiveness of public relations. It is necessary to study the media [1].

So if we can promote the news continuously. And reach the target as well. It will be a way to help the effectiveness of public relations. It is necessary to study the media. The use of media for the purpose of communication will affect the perception of news. And the number of students increasing every year. The researcher was interested. Media perception in recruiting new students to study in Suan Sunandha Rajabhat University To measure the ability of various media. The new recruitment of Suan Sunandha Rajabhat University. It is a guide to the development of various media. To apply to meet more target groups [2].

2. METHODS

This research A study of guidelines for public relations recruitment of Suan Sunandha Rajabhat University. To know the publicity about the admissions channel. Of Suan Sunandha Rajabhat University And to propose a public relations approach to recruit students of Suan Sunandha Rajabhat University. Sub-Section 1

Population used in this study include: New undergraduate students from Suan Sunandha Rajabhat University.

Sub-Section 2

Sample In this study. The sample was selected from a group of new undergraduate students from Suan Sunandha Rajabhat University.

3. RESULTS

From the study. "Study of media perception in recruiting students of Suan Sunandha Rajabhat University" of new students in academic year 2016 to know about media perception in recruiting new students to study at Suan Sunandha Rajabhat University. The results of the research will be beneficial to Suan Sunandha Rajabhat University in terms of public relations, recruitment of new students in the next academic year.

Table 1. The table shows the frequency and percentage of students who answered the questionnaire by gender, age and education.

General information	Number	Percent
- Male	35	11.6
- female	65	88.4
Included	**300**	**100**
Age		
- Under 20 years	113	37.6
- 20-23 years	180	60.0
- 23 years old	7	2.4
Included	**300**	**100**
Term		
- Normal	287	95.6
- Contribution section	13	4.3
Included	**300**	**100**

Most of the students were female, accounting for 88.4%. Male students accounted for 11.6%.

Most students aged 20 to 23 years accounted for 60%, followed by 37.6% under 20 years of age and 23% or less at 2.4%.From Table 1.

Most of the students studied in the normal course was 95.6%, followed by the contributing class of 4.3%

Table 2. Table showing frequency and percentage of students responding to the questionnaire classified by media perception of admission to new undergraduates at Suan Sunandha Rajabhat University.

General information	Number	Percent
1. Frequently Asked Media		
1.1 Television	153	51.0
1.2 Radio	81	27.0
1.3 Newspaper	75	25.0
1.4 Brochures	33	11.0
1.5 Outdoor billboard	92	30.6
1.6 Mailing documents	30	10.0
1.7 Website	185	61.6
1.8 Other Media	35	11.6
2. Sources of student recruitment information for further study at Suan Sunandha Rajabhat University		
2.1 Brochures	61	20.3
2.2 Poster	74	24.6
2.3 Admission and Scholarships	95	31.6
2.4 radio waves	34	11.3
2.5 Outdoor billboard	86	28.6
2.6 www.ssru.ac.th	197	65.6
2.7 Educational Guidance	113	37.6
2.8 Exhibition of the University	67	22.3
3. Knowing Suan Sunandha Rajabhat University before applying		
3.1 know	297	99
3.2 Unknown	3	1
Included	**300**	**100**

Frequently Asked Media Most of the students received the news from the website, 61.6%, followed by television with 51.0%, and the lowest was the document which was sent to the media, representing 10.0%.

The source of information for admission to study in Suan Sunandha Rajabhat University. Most students receive information on the website. www.ssru.ac.th Most of them were 65.6%, followed by counseling 37.6% and least radio frequency 11.3%.

4. CONCLUSION AND FUTURE WORK

The results of the research found that personal communication was the guiding aspect of education, which led to new students' perception of news. that means Suan Sunandha Rajabhat University should be encouraged to be more effective. The study guide can provide information on student admissions.

Recognition of the media to recruit new students for further study at Suan Sunandha Rajabhat University The research found that the Internet made new students the most informed information.

5. ACKNOWLEDGEMENTS

The researchers would like to give thanks to tourism academics at Suan Sunandha Rajabhat University, government officers from tourism supporting organizations for giving us directions and suggestions. Thanks to all friends in helping us collect data and information. More importantly, to our fathers and mothers who always encourage us to complete this research task and to those who not mentioned.

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FACTORS AFFECTING GREENHOUSE GAS EMISSION FROM SWINE FARMS IN SUPHAN BURI PROVINCE, THAILAND

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ABTRACT

This research aimed to study on the emission of greenhouse gases (GHGs) from swine farms in Suphan Buri Province, Thailand. The objectives were to investigate the concentration of greenhouse gases emitted in a day round from wastewater systems in swine farms, and also to indicate the relationship of factors affecting the emission of greenhouse gases from those systems. A number of four farms having stabilization pond system in the study area were selected as the sample size. Then, CO_2 and CH_4 concentrations emitted from those farms were measured every one hour during 06.00 am. to 20.00 pm. Air temperature, pH and BOD of wastewater were also recorded at the same time as the measurement of greenhouse gases. Spearman correlation coefficient with the significant level of .05 was used to indicate the relationship between concentrations of CO_2, CH_4 and the factors mentioned earlier. As a result of the study, it was found that (1) the highest concentrations of CO_2 and CH_4 were subsequently in anaerobic, facultative and maturation ponds of the wastewater system in swine farms. Of these, CH_4 concentrations were higher than those of CO_2 in every pond of the system; and (2) the relationship between air temperature and GHG concentrations was highly significant at the level of .01 with the correlation coefficients (r) of 0.547 and 0.441 for CO_2 and CH_4; the relationship between pH of wastewater and GHG concentrations was highly significant at the level of .01 with the correlation coefficients (r) of -0.769 and -0.686 for CO_2 and CH_4; and the relationship between BOD of wastewater and GHG concentrations was significant of the level of .05 and .01 with the correlation coefficients (r) at 0.359 and 0.609 for CO_2 and CH_4, respectively.

Keywords: greenhouse gases, carbon dioxide (CO_2), methane (CH_4), swine farms, stabilization pond system.

INTRODUCTION

Nowadays the problem of climate change occurs very widely in every part of the world. This situation can be described by the reason of global warming that is related to the increase of greenhouse gases covering the atmosphere especially in the ozone layer. It is known that human activities in agricultural sector such as paddy field and livestock farming, production of goods and services in industrial sector, development of mass transportation, deforestation and dispose of solid wastes are all the very important causes of greenhouse effect. It was reported that cultivation of main crops led to the release of greenhouse gases to the atmosphere about 24% while livestock farming produced not less than 18% of the whole amount of greenhouse gases caused by agricultural sector [1]. In the case of Thailand, Ministry of Energy stated that, in the year 2005, activities from energy sector was the main source to produce the highest amount of greenhouse gases or about 56.1% and followed by agriculture, waste generation, land use change and deforestation, and industry at 24.1, 7.8, 6.6 and 5.4%, respectively [2].

The release of greenhouse gases from biodegradation of wastewater in swine farms under the anaerobic condition is also a very important source. According to the study by Thapinta (2007), biodegradable activity in anaerobic filter tank in wastewater systems of swine farms released CO_2 and CH_4 at the amount of 57 to 5,545 ppm and 11 to 5,924 ppm; in addition, the releases of those GHGs from stabilization pond in wastewater systems of swine farms were at 1,500 to 16,110 ppm for CO_2 and 2,755 to 28,662 ppm for CH4, respectively [3]. It was also found that farmers in Thailand generally used 10 to 20 liters of water per head of swine per day for cleaning their farms. These amount of water were then collected to wastewater system of swine farms. As a study by Pollution control department (1999), wastewater from the small size of swine farms contained organic wastes in the form of BOD at 1,500 mg/L by average whereas those from the medium and large sizes of swine farms contained organic wastes in the form of BOD at the average of 2,500 to 3,000 mg/L [4].

It is anticipated that wastewater from swine farms in Thailand will be more seriously pollution. This is because there are a large number of swine population in each year. In 2014, for example, there were 191,545 swine swarms with approximately 9.5 million of swine population around the country [5]. Therefore, relevant government agencies need to pay more attention to control wastewater pollution in swine farms so that the emission of greenhouse gases from this source would be mitigated.

OBJECTIVES

Objectives of this research on factors affecting greenhouse gas emission from swine farms in Suphan Buri Province, Thailand, were as follow:-

1. To investigate the concentration of greenhouse gases emitted in a day round from wastewater systems in swine farms, and
2. To indicate the relationship of factors affecting the emission of greenhouse gases from those systems.

METHODOLOGY

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

1. Field survey

In this research, a number of four swine farms in Suphan Buri Province having stabilization pond system were selected as the sample size. The stabilization pond in wastewater system of each farm consisted of anaerobic, facultative and maturation pond, respectively. Data collection were focused on the emission of greenhouse gases, CO_2 and CH_4, from those stabilization pond system in each farm. In addition to GHG emission, the following data which included air temperature, pH and BOD of wastewater in each pond were also collected at the same time during the field survey.

2. Data collection

In this research, the concentration of greenhouse gases emitted from wastewater treatment plants in the study area, pH and BOD of wastewater and also air temperature around the treatment plants were collected by the following processes:-

2.1 Greenhouse gas concentration

CO_2 and CH_4 concentrations emitted from anaerobic, facultative and maturation pond in wastewater systems of four swine farms in the study area were collected by using fluxes chamber at the middle point of each pond. The collection of these greenhouse gases were designed for every one hour starting from 06.00 am. to 20.00 pm. or 14 hours long in a day round. After that, gas detector named “MIRAN SapphIRE XL” was used to analyze the concentrations of CO_2 and CH_4 in each pond.

2.2 Air temperature

Air temperature surrounding anaerobic, facultative and maturation pond in wastewater systems of four swine farms in the study area were measured by using Thermometer. The measurements of air temperature in each pond were took place at the same time as the collection of CO_2 and CH_4 concentrations mentioned earlier. That is, air temperature in each pond was recorded in a day round from 06.00 am. to 20.00 pm.

2.3 pH of wastewater

In the same manner as GHG and air temperature measurement, pH of wastewater in anaerobic, facultative and maturation pond in wastewater systems of four swine farms in the study area were also recorded by using pH meter.

2.4 BOD of wastewater

Wastewater in anaerobic, facultative and maturation pond in those farms were collected and preserved in order to analyze for BOD at the laboratory of Environmental Science Program, Faculty of Science and Technology, Suan Sunadha Rajabhat University.

3. Statistical methods

3.1 descriptive statistics

The descriptive statistics used in this research was mean ($\overline{X}$) of CO_2 and CH_4 concentrations emitted from anaerobic, facultative and maturation pond in wastewater systems in every one hour of the measurement and also mean ($\overline{X}$) of those GHG concentrations for 14 hours long in a day round.

3.2 Inferential statistics

The inferential statistics used in this research was Spearman correlation coefficient (r) at the significant level of 95% in order to indicate the relationship between CO_2 and CH_4 concentrations with air temperature, pH and BOD of wastewater from those systems. In this case, the hypotheses of the study in order to describe the relationship mentioned above were as follow:-

H_0: GHG concentration emitted from wastewater system in swine farms were not related to air temperature, pH and BOD of wastewater.

H_1: GHG concentration emitted from wastewater system in swine farms were related to air temperature, pH and BOD of wastewater.

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. GHG concentration emitted in a day round from wastewater system in swine farms

The concentrations of CO_2 and CH_4 emitted in a day round (14 hours) starting from 06.00 am. to 20.00 pm. in four swine farms in the study area was shown in Table 1. That is, the emission of both CO_2 and CH_4 were found at the highest concentrations from anaerobic pond and followed by facultative and maturation pond of all farms. For example, the average concentrations of CO_2 were at 1,221.80, 1,121.83 and 411.47 ppm and the average concentrations of CH_4 were at 8,223.62, 4,692.40 and 961.52 ppm from anaerobic, facultative and maturation pond in Farm No.1, respectively.

Table 1. The average concentrations of CO_2 and CH_4 emitted in a day round (14 hours) from wastewater system in swine farms

Swine Farm No.	Anaerobic pond		Facultative pond		Maturation pond	
	CO_2 (ppm)	CH_4 (ppm)	CO_2 (ppm)	CH_4 (ppm)	CO_2 (ppm)	CH_4 (ppm)
1 [1/]	1221.80	8223.62	1121.83	4692.40/	411.47	961.52
2 [1/]	706.80	9007.11	637.28	1460.90	422.19/	809.12
3 [2/]	1285.97	4879.23	336.09	1149.44	302.61	603.04
4 [2/]	670.19	2539.85	651.57	1105.03	415.04	600.44

Remark: [1/] Swine farm No.1 and No.2 represented the small size farm with a number of < 500 swine per farm.
[2/] Swine farm No.3 and No.4 represented the medium size farm with a number of > 1,500 swine per farm.

It was also found that the emission of CH_4 was at higher concentration than that of CO_2 in anaerobic, facultative and maturation pond of each farm as shown in Figure 1 to 3.

1.1 Anaerobic pond

The emission of CO_2 and CH_4 from anaerobic pond of each farm in the study area is illustrated in Figure 1 as follow:-

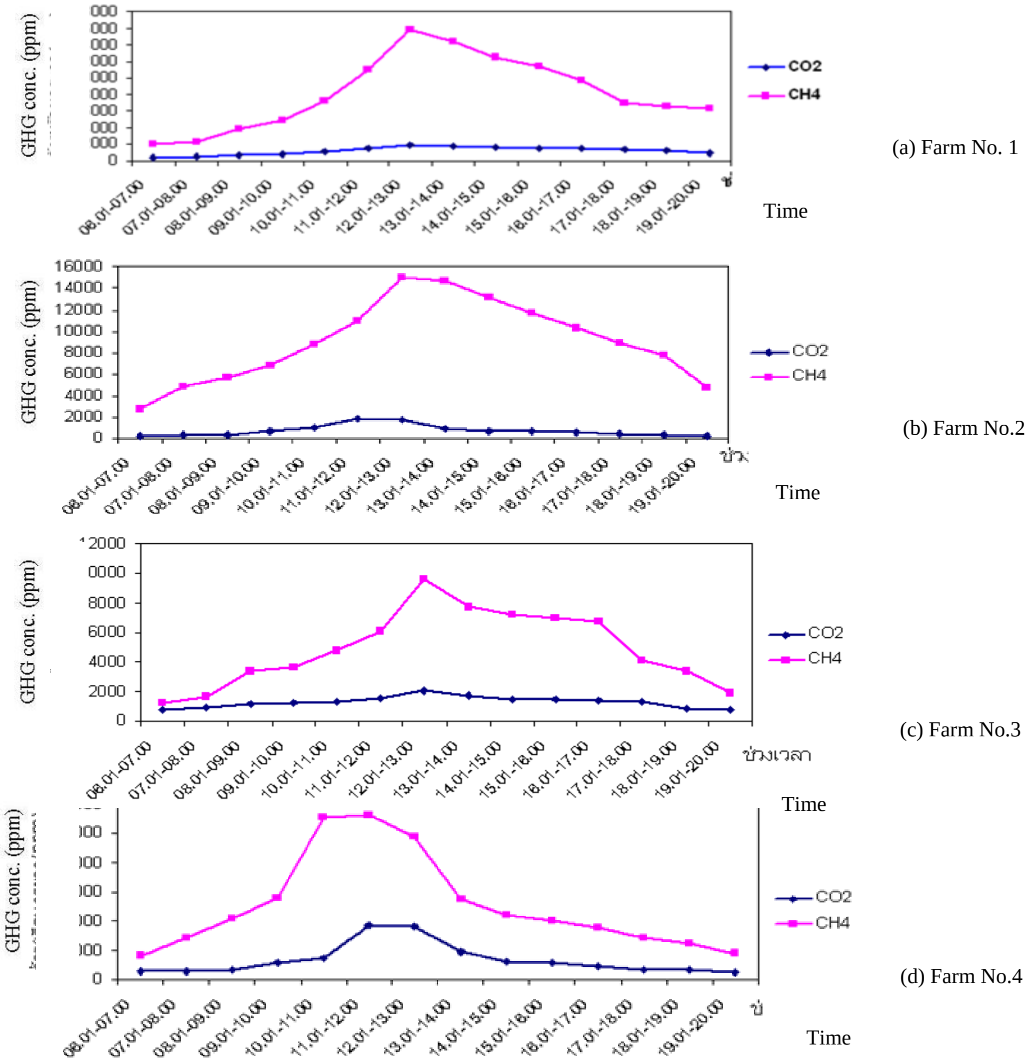
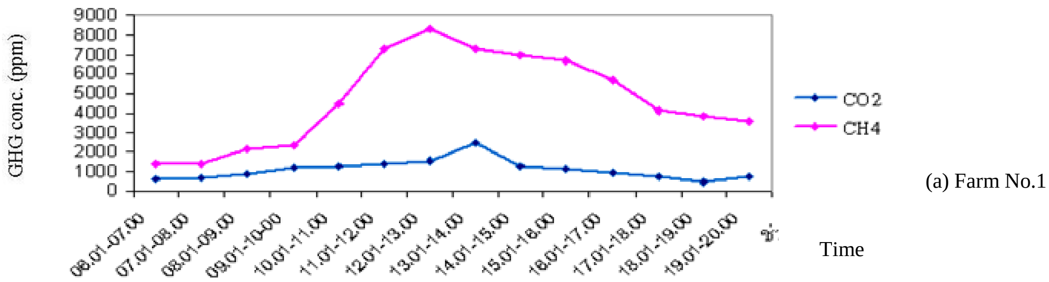


Figure 1. The emission of CO_2 and CH_4 from anaerobic pond in swine farms

1.2 Facultative pond

The emission of CO_2 and CH_4 from facultative pond of each farm in the study area is illustrated in Figure 2 as follow:-



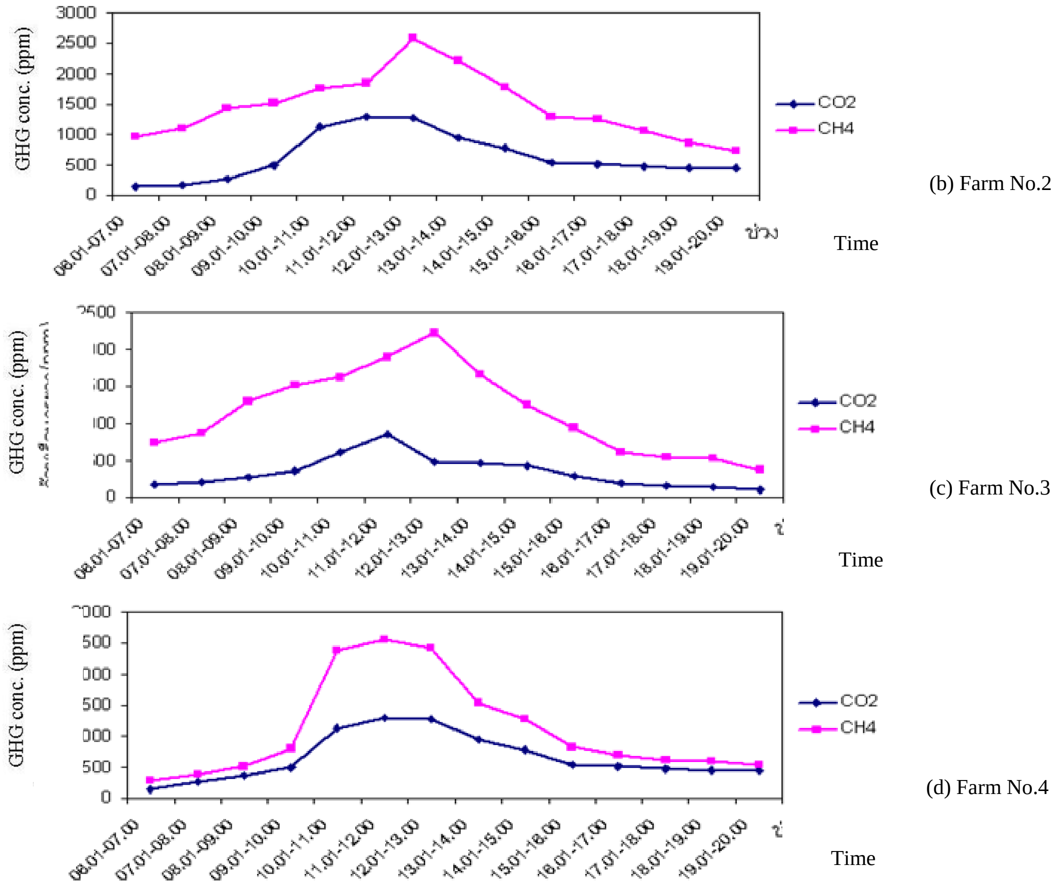
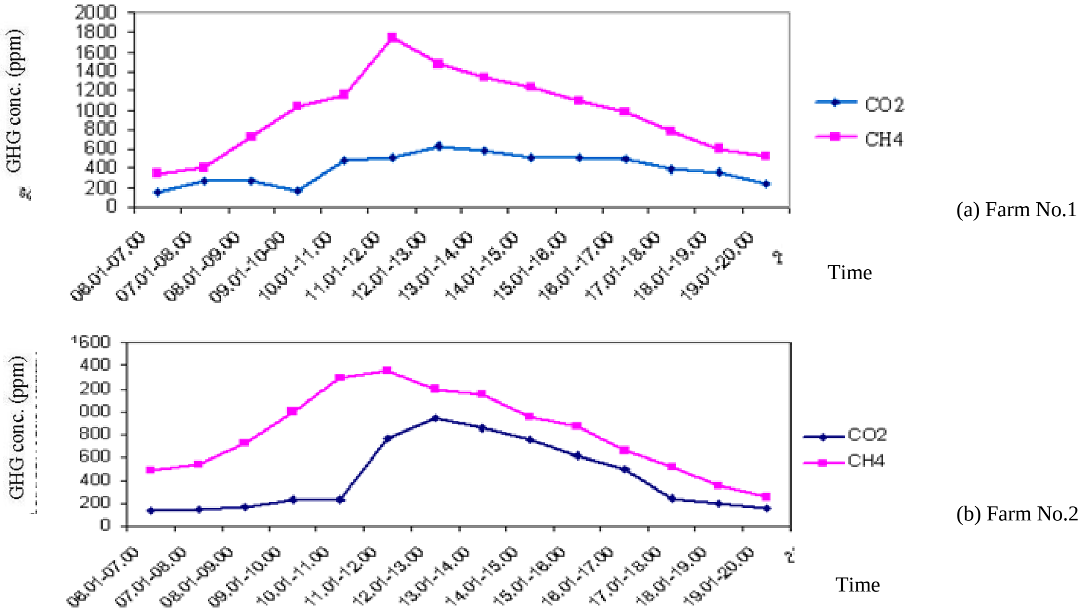
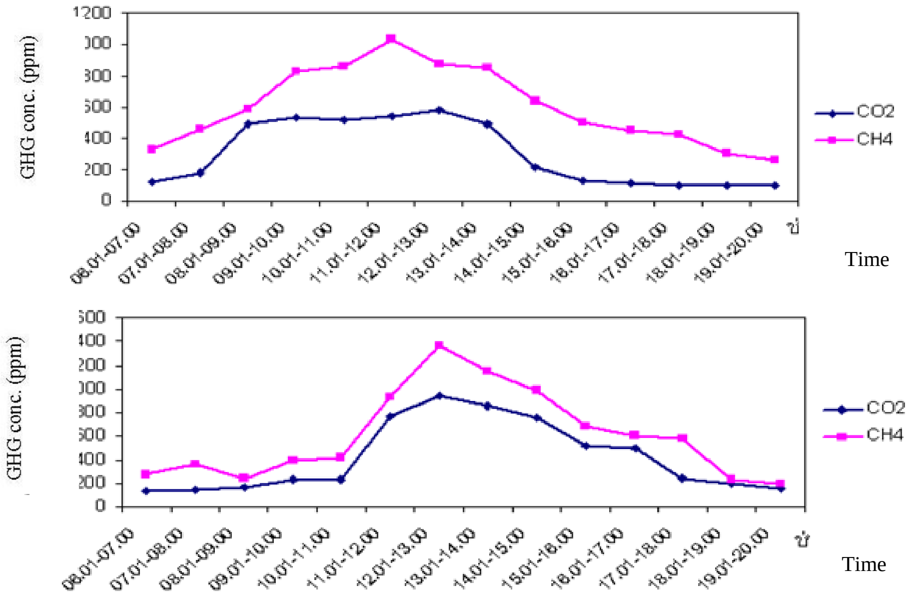


Figure 2. The emission of CO_2 and CH_4 from facultative pond in swine farms

1.3 Maturation pond

The emission of CO_2 and CH_4 from maturation pond of each farm in the study area is illustrated in Figure 3 as follow:-





(c) Farm No.3

(d) Farm No.4

Figure 3. The emission of CO_2 and CH_4 from maturation pond in swine farms

2. The relationship of factors affecting the emission of greenhouse gases from wastewater system in swine farms

2.1 The relationship between air temperature and GHG emission

The average of air temperature in a day round from 06.00 am. to 20.00 pm. surrounding anaerobic, facultative and maturation pond of swine farms in the study area is illustrated in Table 2. It was found that the highest temperatures around those three ponds occurred during 12.00 to 13.00 am. at 40.3 °C; on the other hand, the lowest temperature at the same position was at 06.00 to 07.00 am. at 26°C.

Table 2. The average of air temperature surrounding wastewater systems of swine farms in the study area

Unit: °C

Time	Farm No.1			Farm No.2			Farm No.3			Farm No.4		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
6-7 am.	28.3	28.0	**26.0**	30.3	29.0	29.0	27.3	27.3	27.3	32.7	31.7	30.7
7-8 am.	29.0	29.7	29.0	31.7	30.0	30.0	29.0	28.7	28.7	34.0	32.0	31.0
8-9 am.	31.7	32.3	30.0	34.3	31.7	31.0	36.3	36.0	35.7	34.0	32.7	31.7
9-10 am.	34.3	34.7	32.3	34.7	35.3	33.3	35.7	36.0	37.7	37.3	35.0	35.3
10-11 am.	37.7	37.3	35.0	36.3	37.7	35.0	34.3	37.7	37.0	38.7	36.3	40.0
11-12 am.	38.7	38.7	39.3	37.7	39.7	36.3	36.7	36.0	37.0	39.7	37.7	40.0
12-13 am.	38.3	39.7	40.0	**40.3**	39.7	36.7	35.7	37.7	37.7	37.7	39.3	38.7
13-14 pm.	39.0	40.0	39.7	38.3	38.0	36.3	28.3	34.0	33.3	37.0	39.7	37.7
14-15 pm.	39.3	39.3	39.3	36.7	37.7	35.3	33.7	33.7	33.3	35.7	37.3	36.3
15-16 pm.	36.7	35.3	35.7	38.0	36.0	35.0	29.7	30.7	32.7	33.7	36.3	35.0
16-17 pm.	35.0	33.3	35.0	37.7	34.0	35.3	28.0	28.3	30.3	32.7	34.3	33.3
17-18 pm.	32.0	31.0	33.0	37.0	33.0	34.3	27.0	27.7	29.0	32.3	32.3	32.3
18-19 pm.	30.7	30.0	31.7	36.0	32.0	32.7	26.7	27.3	29.0	32.0	31.3	32.3
19-20 pm.	30.0	29.0	31.0	35.7	31.3	31.3	26.3	27.3	28.3	31.0	29.6	31.3

Remark: (1), (2), (3) represent Anaerobic, Facultative Maturation pond, respectively

Table 3 shows the relationship between air temperature and GHG emission from wastewater system in swine farms using Spearman correlation coefficient at the significance of 95%. As a result of the study, it was indicated that both CO_2 and CH_4 concentrations emitted from anaerobic, facultative and maturation pond in swine farms were related with air temperature surrounding those ponds [Sig. = .000 < α (.05)] at the correlation coefficients (r) of .547 and .411, respectively. It means that if air temperature increases, the emission of CO_2 and CH_4 from swine farms will increase, and vice versa.

Table 3. The correlation coefficient analysis between air temperature and GHG emission from waste water system in swine farms

	Air temperature	CO_2 concentration	CH_4 concentration
Spearman correlation coefficient (r)	1.000	.547**	.441**
Sig. (2-tailed)	.	.000	.000
N	168	168	168

2.2 The relationship between pH of wastewater in swine farms and GHG emission

The average of pH of wastewater in anaerobic, facultative and maturation pond of swine farms in the study area which measured in a day round from 06.00 am. to 20.00 pm. is illustrated in Table 4. It was found that the highest pH of wastewater in those three ponds occurred during 19.00 to 20.00 pm. at 8.4; on the other hand, the lowest pH of wastewater at the same position was at 11.00 to 12.00 am. at 6.03.

Table 4. The average of pH of wastewater in anaerobic, facultative and maturation pond of swine farms in the study area

Time	Farm No.1			Farm No.2			Farm No.3			Farm No.4		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
6-7 am.	7.03	7.47	8.30	8.30	7.40	8.13	7.13	8.13	7.87	7.30	7.67	7.80
7-8 am.	6.93	7.37	7.57	7.23	7.40	8.03	6.73	8.30	7.63	7.33	7.67	7.83
8-9 am.	6.97	7.33	7.83	7.30	7.33	7.90	6.83	8.67	7.63	7.30	7.63	7.73
9-10 am.	6.80	7.33	7.73	7.03	7.17	7.43	6.93	8.30	7.87	7.33	7.57	7.60
10-11 am.	6.83	7.17	7.60	6.37	7.20	7.37	6.93	8.36	7.63	7.23	6.70	7.53
11-12 am.	6.83	6.77	7.63	6.23	7.10	6.10	6.27	7.23	6.73	6.30	**6.03**	6.70
12-13 am.	6.53	6.63	6.83	6.77	6.30	6.47	6.53	7.30	6.83	6.40	6.27	6.37
13-14 pm.	6.83	6.43	6.37	6.93	6.43	6.80	6.57	7.80	6.23	6.40	6.97	6.47
14-15 pm.	6.90	7.20	7.20	7.03	6.90	7.47	6.97	7.97	7.13	7.53	7.60	7.17
15-16 pm.	7.03	7.27	7.23	7.23	7.20	7.93	7.07	8.30	7.17	7.53	7.63	7.60
16-17 pm.	7.00	7.33	8.10	7.23	7.47	7.90	7.13	8.27	8.17	7.50	8.00	7.97
17-18 pm.	7.00	7.40	8.13	7.03	7.40	8.00	7.13	8.20	8.13	7.50	8.00	7.97
18-19 pm.	6.97	7.43	8.16	7.30	7.53	8.03	7.43	8.20	8.17	7.60	8.03	7.97
19-20 pm.	6.87	7.43	8.16	7.43	7.47	8.00	7.60	**8.40**	8.23	7.60	8.00	7.97

Table 5 shows the relationship between pH of wastewater and the emission of CO_2 and CH_4 from wastewater system in swine farms using Spearman correlation coefficient at the significance of 95%. As a result of the study, it was indicated that both CO_2 and CH_4 concentrations emitted from anaerobic, facultative and maturation pond in swine farms were related with pH of wastewater in those ponds [Sig. = .000 < α (.05)] at the correlation coefficients (r) of -.769 and -.686, respectively. In this case, if pH of wastewater increases, the emission of CO_2 and CH_4 from swine farms will decrease, and vise versa.

Table 5. The correlation coefficient analysis between pH and GHG emission from wastewater system in swine
Farms

	pH of wastewater	CO_2 concentration	CH_4 concentration
Spearman correlation coefficient (r)	1.000	-.769**	-.686**
Sig. (2-tailed)	.	.000	.000
N	168	168	168

2.3 The relationship between BOD of wastewater in swine farms and GHG emission

BOD of wastewater in anaerobic, facultative and maturation pond of swine farms in the study area which measured 3 times during this study is illustrated in Table 6. It was found that BOD of wastewater were at the highest level in anaerobic pond and followed by facultative and maturation pond of all farms. For example, BOD were found at 2,103, 1,457 and 806 mg/L by average in anaerobic, facultative and maturation pond of Farm No.1, respectively. It was also shown that BOD of wastewater of all farms in this study varied from 575 mg/L in maturation pond to 3,126 mg/L in anaerobic pond.

Table 6. BOD of wastewater in anaerobic, facultative and maturation pond of swine farms in the study area

Swine farms	Sampling No.	BOD (mg/L)		
		Anaerobic pond	Facultative pond	Maturation pond
1. Farm No.1	1	2567	1685	983
	2	1572	1137	589
	3	2169	1549	847
	average	2103	1457	806
2. Farm No.2	1	**3126**	2593	1995
	2	2641	2036	1783
	3	1506	1202	648
	average	2424	1944	1475
3. Farm No.3	1	2275	1489	1193
	2	1574	1023	625
	3	2486	1334	669
	average	2112	1282	829
4. Farm No.4	1	3012	2394	1849
	2	2458	1923	1396
	3	1534	1218	**575**
	average	2335	1845	1273

Table 7 shows the relationship between BOD of wastewater and the emission of CO_2 and CH_4 from wastewater system in swine farms using Spearman correlation coefficient at the significance of 95%. As a result of the study, it was indicated that both CO_2 and CH_4 concentrations emitted from anaerobic, facultative and maturation pond in swine farms were related with BOD of wastewater in those ponds [Sig. = .031 and .000 < α (.05)] at the correlation coefficients (r) of .359 and .609, respectively. It means that if BOD of wastewater increases, the emission of CO_2 and CH_4 from swine farms will increase, and vise versa.

Table 7. The correlation coefficient analysis between BOD and GHG emission from wastewater system in wine farms

	BOD of wastewater	CO_2 concentration	CH_4 concentration
Spearman correlation coefficient (r)	1.000	.359*	.609**
Sig. (2-tailed)	.	.031	.000
N	36	36	36

CONCLUSIONS

The aims of the study on factors affecting greenhouse gas emission from swine farms in Suphanburi Province, Thailand were to investigate the concentration of greenhouse gases emitted in a day round from wastewater systems in swine farms and also to indicate the relationship of factors affecting the emission of greenhouse gases from those systems. The results of this study showed that the emission of CO_2 and CH_4 in a day round from 06.00 am. to 20.00 pm. were at the highest concentrations in anaerobic pond and followed by facultative and maturation pond of wastewater system in swine farms. In addition, the emission of CH_4 was at higher concentration than that of CO_2 in anaerobic, facultative and maturation pond of every swine farms in the study area. It was also found that air temperature, pH and BOD of wastewater in anaerobic, facultative and maturation pond were all related to the concentration of both CO_2 and CH_4 emitted from wastewater system of swine farms.

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ANTIMICROBIAL MICRODILUTION ASSAY USING TETRAZOLIUM SALT FOR COLORIMETRIC DETECTION

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ABSTRACT

An antimicrobial assay using broth microdilution is a method accepted and approved by Clinical and Laboratory Standards Institute (CLSI). This technique was *in vitr*o and minimized a volume of medium needed to study the susceptibility of bacteria to antimicrobial activity. The technique begins with diluting various drugs and tested substances in 96-well plate. After that, they were mixed with bacterial suspension. The bacterial was optimized the number of active colonies forming unit (CFU) by spectrophotometry technique referred to McFarland standard. According to the conventional technique, we observed the bacterial susceptibility from the fact that clear medium means positive results while turbid medium means negative results. An improvement technique was used tetrazolium salt in colorimetric detection techniques that were easier observed used to ensure accuracy and reproducibility that useful for determining minimal inhibition concentration (MIC) and minimal bactericidal concentration (MBC) of drug and or antimicrobial substances. The bacterial inhibition or bactericidal was confirmed by colony drop count or streak plate technique.

Keywords: colorimetric, tetrazolium, antimicrobial, microdilution

1. INTRODUCTION

Microbiology screening practice is a technique for studying the microbial physiology, microbial growth, microbial metabolism, microbial drug susceptibility, and establishing cultured cells. Most common techniques must be able to reproduce estimates, have precision and can be easily observed. There must be performed viability of the population as the percentage of cells living or cells inhibition. The microbial growth or its inhibition can be measured by culturing techniques, e.g. viable counts, direct technique microscopic counts, cells turbidity measurement, bioluminescence and or fluorimetry. The most common technique using the reduction of tetrazolium salts from colorless or weakly colored. The dyes are dissolved in aqueous solutions to brightly colored derivatives known as formazans. This has been the basis of their use as vital colors in redox histochemistry and in biochemical applications for more than fifty years [1].

Tetrazolium salt had been known as a colorimetric dye changing from with artificial chromogenic products. The term tetrazolium is derived from the chemical structure, as it is penta-heterocyclic ring compounds with four atoms (tetra) of nitrogen (aza) in the tetrazole ring, defining this group of organic salts. The additional one or two hydrogen atom (1H or 2H) in the nomenclature of tetrazolium salt describes the formal location of hydrogen atom (Fig. 1) [2]. It is developed by the reduction reaction base on an electron grained and created bonding with hydrogen changing from tetrazolium to formazan shown in figure 1 [3]. The electron donner were coming from enzymatic reaction, dehydrogenases, and reductases which were created from living organism.

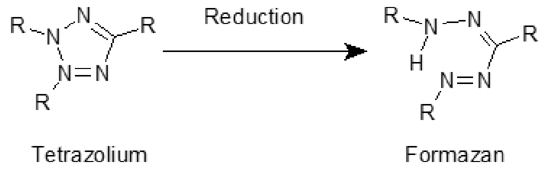


Figure 1. The tetrazolium derivative structure from grained electron to created hydrogen bonding to open ring transform to formazan by reduction [3].

They have a variety of tetrazolium derivative that they are different in shade colors such as dark blue, deep red, and orange depending on the functional group (R group, Fig.1) and the reaction. Tetrazolium is a substrate for the enzymatic reaction. Leading examples of six common tetrazolium salts include 1) TTC or tetrazolium chloride or 2,3,5-triphenyl-2H-tetrazolium chloride, which is water-soluble. 2) INT or 2-(4-iodophenyl)-3-(4-nitrophenyl)-5-phenyl-2H-tetrazolium chloride, which is water-insoluble. 3) MTT or 3-(4,5-dimethyl-2-thiazolyl)-2, 5-diphenyl-2H-tetrazolium bromide, which is water-insoluble and used in the MTT assay. 4) XTT or 2,3-bis-(2-methoxy-4-nitro-5-sulfophenyl)-2H-tetrazolium-5-carboxanilide, which is water-soluble. 5) MTS or 3-(4,5-dimethylthiazol-2-yl)-5-(3-carboxymethoxyphenyl)-2-(4-sulfophenyl)-2H-tetrazolium, which is water-soluble and used in the MTS assay. 6) NBT used in a diagnostic test, particularly for chronic granulomatous disease and other diseases of phagocyte function [4]. Culture broth macro- or microdilution techniques for Minimum Inhibitory Concentration (MIC) determination are recommended by CLSI (NCCLS) [5]. The search for drugs targeting mycobacterium is delayed because of either continuing CFU or following unexpectedly slow growth mycobacterium and longer incubation with the dye as the main assessment technique, both of which are primarily designed for very low throughput screening. Apart from these disadvantages, incubation of the dye for a longer period could changes in the metabolic and physiological status of the bacilli under investigation. The application of tetrazolium salt MTT and XTT along with menadione was able to viable bacilli during the screening of anti-*Mycobacterium* spp drugs. Due to the addition of menadione in this assay, superoxide was generated in the bacilli which rapidly reduced XTT to produce the color [6]. However, the use of tetrazolium salts is a well-known method for analyzing M. tuberculosis strains while the addition of menadione is a new development in this context [7, 8]. The following compound INT and TTC were using in electron transport reducing bacteria. The bacteria were sulfate-reduced tetrazolium salt INT and TCC to forming intracellular formazan deposits. The bacteria was uptake INT reduction rate higher than TCC which did not inhibit growth and forming for the direct count and colorimetric expedient observation [9]. Consequently, conventional methods of antimicrobial susceptibility testing are both precise and reproducible when applied to the microorganism that has specific growth requirements or a slow rate of growth. In this performed colorimetric methods could represent an alternative approach. Tetrazoliums salts have been used as colorimetric indicators since bacteria or fungi convert them to colored formazan derivatives that can be observed.

Resazurin (7-Hydroxy-3H-phenoxazin-3-one 10-oxide or IUPAC name, 7-hydroxy-10-oxidophenoxazin-10-ium-3-one,) show in Figure 2 also known in other names Alamar Blue, Vybrant, and UptiBlue is a blue dye, itself weakly fluorescent [10] until it is irreversibly reduced to the pink colored and highly red fluorescent resorufin as shown in figure 2. It is used as an oxidation-reduction indicator in cell viability assays for both aerobic and anaerobic respiration of bacterial growth and survival [11]. Usually, it is available commercially as the sodium salt that easily to dissolve in water.

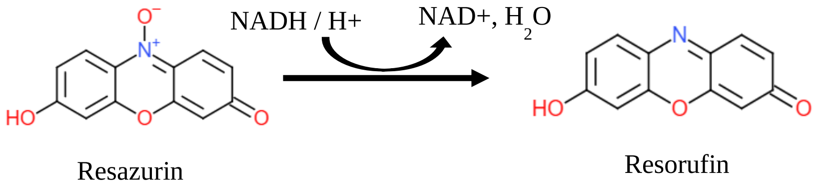


Figure 2. Reszurin dissolved oxidizing agent with polar un chart molecule and dark blue colors, then reduction be uptake an electron oxidized form to pink color, Resorufin [10].

In the present study, we developed a colorimetric assay for MIC determination, based on two different oxidizing agents, TTC (2,3,5-triphenyl tetrazolium chloride) and Resazurin by broth microdilution 96-well plate. Objectives of this study were (i) to determine if the use of tetrazolium salts and resazurin could enhance the sensitivity and accuracy of MIC determination by broth microdilution method for gram positive and gram negative bacterial which have specific growth requirements; (ii) which salt is the most appropriate for determination of antimicrobial activity; (iii) and to determine the antimicrobial susceptibility for Thai's medicinal herb extract.

2. MATERIALS AND METHODS

2.1. Bacterial strains and growth conditions

The bacteria culture were grown in Mueller–Hinton agar (MHA) medium (pH 7.3). All of the testing cultures came from American Type Culture Collection (ATCC) that recommended for drug susceptibility testing isolates. The bacteria were using *Bacillus subtilis* (ATCC6633) stand for gram-positive, rod-shaped bacteria, *Enterococcus faecalis* (ATCC2921) stand for gram-positive, diplococci and single cocci, *Staphylococcus aureus* (ATCC25923); gram-positive, round-shaped and grape-like clusters, *Pseudomonas aeruginosa* (ATCC741) Gram-negative, rod-shaped, motile organism (polar flagella). Plates performed incubation overnight at 37 °C for 18-24 hr in ambient. Chosen the fresh single 4-5 colonies for the MIC procedure.

2.2. Determination of the minimum inhibitory concentration (MIC)

The bacterial cultures were grown in broth MHB using the horizontal orbital incubator shaker (Forma®435) at 150 rpm and 37 °C for several hours till logarithmic phase (O.D.625 ~0.1) was reached. After growth, the cells suspensions were prepared by spectrophotometer using culture broth adding sufficient sterile medium to adjust the transmittance that related turbidity standard equivalent to a 0.5 McFarland standard match to an optical density (OD) 0.1 at 625 nm wavelength [12].This results in a suspension containing approximately 1 to 2 × 10^8 colony-forming units (CFU)/mL [12,13,14]. Optimally within 15 minutes of preparation, dilute the adjusted inoculum suspension in MHB so, after inoculation, each well contains approximately 5 × 10^5 CFU/mL (range 2 to 8 × 10^5 CFU/mL). For example, if the volume of broth in the well is 0.1 mL and the inoculum volume is 0.01 mL, then the 0.5 McFarland suspension (1 × 10^8 CFU/mL) should be diluted 1:20 to yield Clinical and Laboratory Standards Institute [12,13,14].

2.3. Plant extraction for anti-bacterial susceptibility testing

Three types of herbal plants selected for anti-bacterial susceptibility testing were *Hydrocotyle sibthorpioides* Lamk., *Paederia linearis* Hook. f., and *Eupatorium odoratum* Linn. The fresh herbals were grounded in a blender using 250 g then plant samples will be extracted using 500 ml hexane or dichloromethane. The extraction using a 1 litter screw cap bottle to fill plant material mixed with organic solvent then shaking in orbit shaker 150 rpm for 48 hr at room temperature with twice a time. The samples were filtrated pass through (Whatman® No.1) and the residue was continuing to re-extraction with an organic solvent. The filtrated of each solvent were pulled and evaporated by a rotary evaporator (Rotavapor® R-300, BUCHI) to remove the solvent and dried in a desiccator. The crude continued to weigh and dissolved in DMSO (dimethyl sulfoxide) for the next experiment [13,14].

2.4. Colorimetric viability assay

Tetrazolium salts TTC (2,3,5-triphenyl tetrazolium chloride) was purchased from Merck (cat. 1083800010) and , Warrington, PA. DAPI and resazurin sodium salt (7-Hydroxy-3H-phenoxazin-3-one-10-oxide sodium salt) was purchased from Sigma-Aldrich (cat. R0717). TTC and resazurin were prepared by dissolves in sterile distilled water with 50 µM concentration then added to 30 µl in each 96-well plates from the total volume 200 µl. At the end of 40 min incubation, color development were observation. TCC was colorless reduction to red color and resazurin was dark blue reduction to pink color.

3. RESULTS AND DISCUSSIONS

3.1. Plant extraction and yields

The results of crude extraction from herbal plants were shown in table 1. *H. sibthorpioides* Lamk. (Fig. 3A) was obtained 0.1126 % (w/w) by hexane, *P. linearis* Hook. f. (Fig. 3B) was 0.1214 % (w/w) with dichloromethane extraction, and *E. odoratum* Linn. (Fig. 3C) was obtained 0.4726 % (w/w) of the solvent dichloromethane respectively. The metabolite from hexane extraction was nonpolar and difficult to dissolve with water while crude extracted from dichloromethane was amphoteric. Anyway, most of them were dissolved in DMSO before an attempt to perform testing. *H. sibthorpioides* Lamk. is *Apiacea*e (Umbelliferae) family [15], it grows with root fry along the ground, branched off the stem with fibrous roots 10-50 cm in length. Single small curved leaf with 5-7 wavy but sometimes up to 9 wavy leaves from the base. The number of leaves is equal to each leaf. Inflorescence clusters of 3-10 flowers bundle in the green leaf very young leaves. Heavily curved 5-7 wavy but sometimes up to 9 wavy leaves from the base. The number of leaves is equal to each leaf and the inflorescence clusters of 3-10 flowers bundle in the green leaf very young leaves (Fig.3A). *P. linearis* Hook. f. is in family *Rubiaceae*, it is a small vine. It has a unique, long-tinged smell and white color. It has a diameter of about 2.8-5 centimeters, petioles, petioles, and inflorescences. They are commonly known as sewer vines because of the strong odors and unique exuded when their leaves or stems are crushed or bruised. *E. odoratum* Linn. is in family *Compositae*, it is a diffuse shrub with angular pubescent branched stems up to about 8 ft. high; florets white, mauve or pale blue in heads arranged in sub-umbellate inflorescences at the ends of short branches; a rank-scented weed (Fig. 3C).

Table 1. The crude extract from herbal plant

Plant species	Organic solvent	Weight (g)	Percent yield (%)
H. sibthorpioides Lamk.	hexane	0.2814	0.1126
P. linearis Hook. f.	dichloromethane	0.3034	0.1214
E. odoratum Linn.	dichloromethane	1.1814	0.4726

3A **3B** **3C**

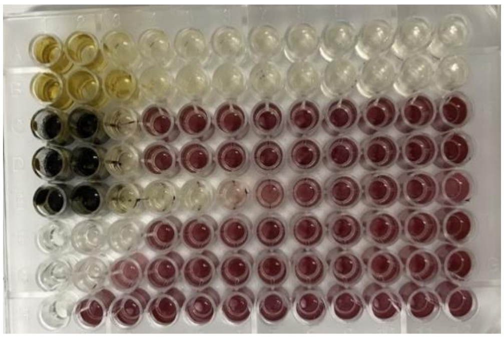
Figure 3. The medicinal plants *H. sibthorpioides* Lamk. (3A) is *Apiaceae* (Umbelliferae) family, *P. linearis* Hook. f. (3B) in family *Rubiaceae*, and *E. odoratum* Linn. (3C) family *Compositae.*

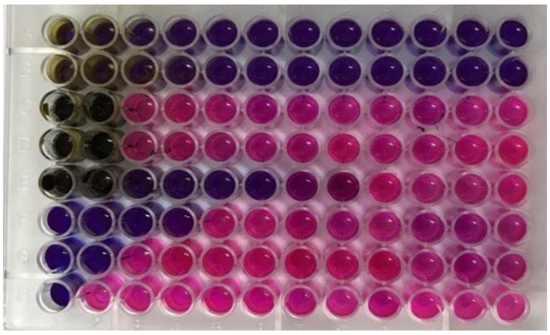
3.2. The minimum inhibitory concentration (MIC)

In our experiment using whole part of plant extraction in order to primary screening the antibacterial activity. The result of cured extract screening for antibacterial of the minimum inhibitory concentration (MIC) (Table 2) indicated that crude extracted of *H. sibthorpioides* Lamk. had the strongest MIC activity with *B. subtilis* in 100 µg/ml, *E. faecalis* in 100 µg/ml, and S. aureus in 100 µg/ml. Whereas crude metabolite from *P. linearis* Hook. f. had MIC activity with *E. faecalis* in 105 µg/ml and *S. aureus* in 210 µg/ml. *P. aeruginosa* was the most resistant bacteria, however, the bioactive metabolite from *P. linearis* Hook. f. had inhibited at 13438 µg/ml. Most of the testing plant were gave crude metabolite against all bacterial testing in various lowest concentration MIC.

Table 2. Comparative MIC values of 3 plants crude extracted against *B. subtilis*, *E. faecalis*, *S. aureus*, and *P. aeruginosa* by TTC and Resazurin under aerobic condition. MIC was defined as a lowest concentration of the crude extracted /test compound that results in ≥90% inhibition of viability.

Plant species	*B. subtilis* (µg/ml)		*E. faecalis* (µg/ml)		*S. aureus* (µg/ml)		*P. aeruginosa* (µg/ml)	
	TTC	Resazurin	TTC	Resazurin	TTC	Resazurin	TTC	Resazurin
H. sibthorpioides Lamk.	100	100	100	100	100	100	25625	25625
P. linearis Hook. f.	13438	13438	105	105	210	201	13438	13438
E. odoratum Linn.	3672	3672	459	459	14688	14688	58750	58750





4A **4B**

Figure 4. Colorimetric viability assay for minimum inhibitory concentration (MIC) in 96-well plate comparison using tetrazolium salt, TTC (4A) and Resazurin (4B). TTC has shown colorless inhibition of bacterial then reduced form to red color, bacterial growth. Resazurin has a dark blue color for bacterial inhibition and then reduced to pink color that means the non-inhibition concentration of testing well.

3.3. The colorimetric viability assay for minimum inhibitory concentration (MIC)

The MICs obtained by the rapid colorimetric assay using tetrazolium salt, TTC, and resazurin. The broth microdilution methods had performed crude metabolite from plant extract to interpretive categories of anti-bacterial susceptible inhibition, intermediate, and resistant strains (Figure 4). Tetrazolium salt, TCC was colorless form when bacterial inhibit by plant metabolite while it changes to red color meanwhile bacterial were resistance. The intermediate of inhibition was pale red in between colorless well and red well (Fig. 4A). Resazurin has developed the colorimetric viability assay for minimum inhibitory concentration (MIC) by changing from dark blue color to reduced form pink color (Fig. 4B). Inhibition bacterial was dark blue resazurin whereas the intermediate was dark pink then the bacteria were resistance, it reduced to resorufin [10] shown in pink color. The comparison of colorimetric assay between TCC and resazurin was given the same result viability clear-cut as MICs concentration in Table 2.

4. CONCLUSION

Herbal plants *H. sibthorpioides* Lamk., *P. linearis* Hook. f., and *E. odoratum* Linn. has been used in assessing traditional Thai claims about the therapeutic potential of medicinal plants and to select plants for future phytochemical research. Nonpolar organic solvent (hexane) had a potency to extract bioactive metabolite from *H. sibthorpioides* Lamk and gave 0.1126 % (w/w) yield. Their properties for antibiotic susceptibility tests from broth microdilution methods that provide the MIC used to define anti Gram-positive spore forming *B. subtilis* (100 µg/ml), anti the bacterium inhabiting the gastrointestinal tracts of humans *E. faecalis* (100 µg/ml), and anti *S. aureus* (100 µg/ml) which is a common cause of skin infections including abscesses, respiratory infections such as sinusitis, and food poisoning [16]. A moderately polar non-charge, dichloromethane solvent can be used to extract plant metabolite from *P. linearis* Hook. f. shown the performance anti *P. aeruginosa* with MIC 13438 µg/ml. This bacterium is Gram-negative and is considered medical importance, a multidrug resistant pathogen recognized for its ubiquity, and its intrinsically advanced antibiotic resistance mechanisms. However, all testing plants had a crude metabolite capable of susceptibility for *P. aeruginosa.*

The colorimetric assay using tetrazolium salt, TCC and Reszurin enhanced the viability visual for clear-cut MIC broth microdilution assay in 96-well plate. Both of them were 50 mM with minimal volume 30 µl per total 200 µl volume. According to reduction reaction to had uptake an electron from living microorganism changing colorless tetrazolium, TCC to red formazan complex (Fig. 1) as a similarity to oxidizing form Resazurin had dark blue color grained electron from living bacteria changed to reducing from Resorufin had pink color (Fig. 2). From the result of the colorimetric assay, Resazurin had less advantages than TCC in the dark crude metabolite sample, it is more difficult to observe under colorless TCC than Resazurin.

However, more studies are needed to fully understand the potency of the herbal plant before we are certain that its extracted and purified can be widely used as bioactive metabolite for adapted drug susceptibility testing methods or screening anti-microbial assay. For now, colorimetric detection assay is recommended for high throughput and simple method.

5. ACKNOWLEDGEMENTS

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MARKETING MIX RELATE TO TOURISM MOTIVATIONS OF INTERNATIONAL TOURISTS TO PARTICIPATE THAI BOXING ACTIVITY IN PHUKET PROVINCE

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Abstract

Tourism is the significant industry to Thailand economic because tourism is on of top three industries that generate income to the country. In 2015, there were 29,881,091 foreign tourists visited Thailand that increasing 20.44 percent from 2014 and forecast that the number of tourists would continuous increasing every year. The significant tourism activity that could attract foreign tourists is Thai Boxing that represented as sport and cultural heritage of Thailand.This study is cross-sectional study purposed to examine the marketing mix related to foreign tourist motivation to participate Thai Boxing activities in Phuket Province, Thailand. The data collected from 278 foreign tourists who participated Thai Boxing class, participated Thai Boxing training program, participated Thai Boxing fight, and participated in Thai Boxing show by using face to face questionnaire. The sample was selected by convenience sampling and the data was collected between July-December 2017.The result found that marketing mix factors which are statistically significant positive relationship with push motivation are staffs and price and these factors have 64.8 percent predictive power and Std. error of the Estimate =.712. The marketing mix factors which are statistically significant positive relationship with pull motivation are staffs, promotion, and price. These factors have 64.3 percent predictive power and Std. error of the Estimate =.591.

Keywords: marketing mix, tourism motivation, Thai Boxing

Introduction

Tourism is the significant industry to Thailand economic because tourism is on of top three industries that generate income to the country. In 2015, there were 29,881,091 foreign tourists visited Thailand that increasing 20.44 percent from 2014 and forecast that the number of tourists would continuous increasing every year. The significant tourism activity that could attract foreign tourists is Thai Boxing due to it represented as sport and cultural heritage of Thailand (NuannareeSriwaralak, 2010). Thai boxingstudying or training is knowledge including national pride and supportive health via exercise and could mental training to be stability, strong, and patience (WareeWidjajaet.,al 2010). A lot offoreign tourists interest and were attract by Thai Boxing to travel to Thailand purposed to studying Thai Boxing. Not only beautiful natural tourist attraction that could attract foreign tourists, but Thai Boxing activities also motivate foreign tourists to visit Thailand and study Thai Boxing in many gyms.

Phuket is the popular tourist destination that there are a lot of foreign tourists visit and intend to training Thai Boxing and Thai Boxing gym provide Thai Boxing class and Thai Boxing show. The foreign tourists normally require to practice Thai Boxing class, participate in Thai Boxing show, and view Thai Boxing show. Some gyms provide accommodations due to some foreign tourists are long-stay and the room rate in Thai Boxing gym is reasonable. Therefore, there are a lot of foreign touristsselect to stay in Thai Boxing gym due to it convenient for training in the morning and evening and convenient to travel to other places.

The survey of Ministry of Tourism and Sports (2013) represented that there are 1,762 Thai Boxing gyms in Thailand and 443 gyms are prepared to support the tourists, 75 gyms located in central region, 116 gyms locate in northern region, 147 gyms located in northeastern region, and 115 gyms located in southern region. Thai Boxing gym could separate into 3 types (1) The Boxing gym for foreigner to participate the competition (2) Thai Boxing gym for education and training and (3) Thai Boxing gym for long stay tourists who require to training Thai Boxing (Nathanicha Na Nakorn, 2015).Therefore, Ministry of Tourism and Sports is the significant department to support and develop sport activities and Thai Boxing represented culture and martial arts of Thailand that could increase economic value and generate income based on sport tourism trend.

Nevertheless, the increasing of Thai Boxing gyms in Thailand and other countries effected to the increasing of competitors due to the number of foreigner who require to study Thai Boxing is continuous increase. The various size Thai Boxing gyms normally provide Thai Boxing amenities such as boxing gloves andboxing shorts. Furthermore, some hotelsdevelop business strategy byusing Thai Boxing as the signature to generate income and motivate the tourists to participate provided activity by offer Thai Boxing training package included accommodation, food, and other activities including provide Thai Boxing show to hotel guests. Nevertheless, these marketing promotion effected to the image of Thai Boxing as barbaric sport, impaired activity, and represented the cause of gambling.

This survey iscross sectional research purposed to examined marketing mix affected to push and pull motivation of foreign tourists to participate in Thai Boxing activities in Phuket province, Thailand and purposed to suggestthe method to support Thai Boxing activities to foreign tourists to create the effective Thai Boxing gym and concerned business including examine the appropriate method to develop Thai Boxing business in the future.

Review of Literature

Thai boxing

Thai Boxing is the folk martial art of Thailand that represented outstanding technique by using organs as weapon and determined as unique national arts of Thailand (PrasertThupsen, 2007).

The word ‘Thai Boxing’ was created after “The Siamese revolution of 1932” purposed to accordednationalism policy at that time. In 2014, Pongtorn Sangwipark studied The Art of Thai Boxing as the World Cultural Heritage and found that Thai Boxing worship dance in present day purposed only followed the tradition that different from the past that the dance purposed to created impressive performance. Thai Boxing schools and gyms both in Thailand and other countries are popular in current day especially in Asean, Japan, Korea, Europe, America, and Russia. Furthermore, Thai Boxing was the significant media to represented culture. Move (2004) explained that Thai Boxing presented national arts via various media such as movies, comics, animations, and games.

In 2014, United Nations accepted Thai Boxing as one of the Global Community Sportsand signed with World Thai Boxing Association and International Federation of Muaythai. Amateur (IFMA). According to the supporting from these departments, it could affect to Thai Boxing to be proud in their careers and they could move forward to be champion based on frequently training and strictly follow the gym’s rule (Wasana Losuwan and Surawut Padthaisong, 2015).

Tourism and Tourist Motivation

Boonlert Jittangwattana (2005) explained Tourism as the temporary travel from one place to another place and the travel is not purpose to working or generates income. Sombat Karnjanakit (2001) described that tourism is not purpose to relaxation or enjoyment but including other purposes such as seminar/convention, knowledge seeking, sport tourism, business travel, and visit the relatives. Chalongsri Pimonsompong (2007) concluded tourist into 2 types as 1) traveller referred to tourists, excursionists, immigrants, people who work in borderline areas, and government officers who assigned to stay in different countries and 2) tourists means people who visit the country and stay over 24 hours and could separate into international tourists and domestic tourists.

The meaning of motivation was explained as the combination of motives based on physical, mental, and personal cultural lifestyle needsthat could create customer behavior and could divided into 2 types as 1) Physiological motive was a motive caused of a basic physiological need such as hungry, thirsty, and sexual desire and 2) social motive was the motive became from social learning such as require for love, warming, and require social acceptance (WeerawanMarangkun, 2014). ChalongsriPimonsompong (2007) explained tourist motivation as the motive cause of physiological and psychological needs that propelled to create tourism activities purposed to responded needs and establish tourists satisfaction. Cohen (1974) described tourist motivation as “the movement” that could persuade or induce people behavior which characterized as the propelling behind every operation. Chan and Baum (2007) clarified tourist motivation as the dynamic process of psychological factor covered personal needs and goals that according to SaengduenRatinthorn (2012) who explained that tourist motivation was the incentive to motivate people who seeking satisfaction via goal-directed behavior by travel to the attraction to satisfy their needs or escape from corny lifestyle including travel to visit friends or relatives. Tourist motivation could separate as 2 characteristics aspush motivation and pull motivation.

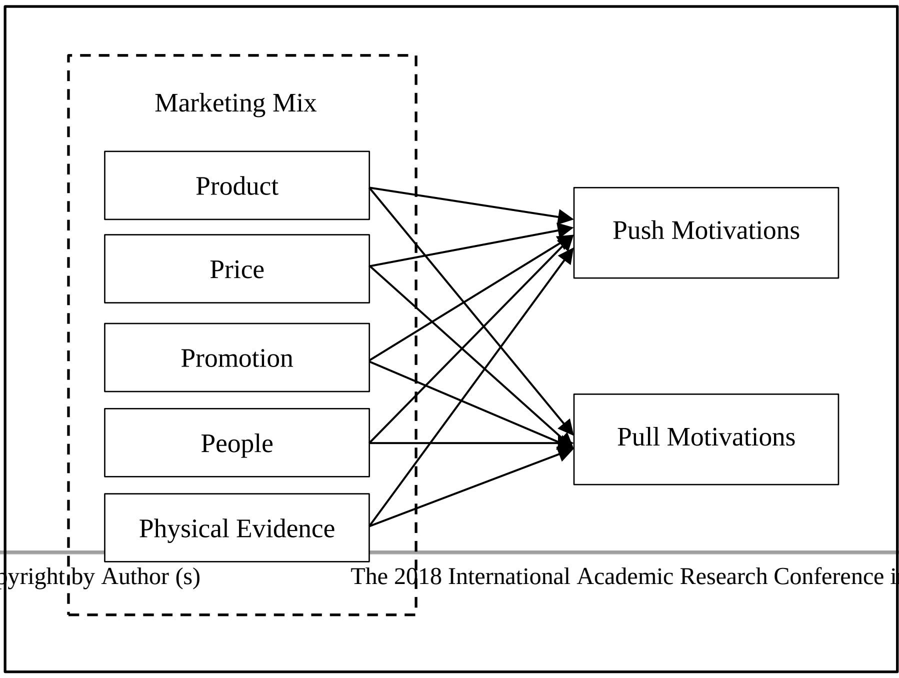
Push motivations was describe as psychological motivation or internal needs that motivate to travel orinternal cause that inspire to travel. Dann (1977) and Crompton (1979) explained push motivations as physical needs such as need to relax after hard work, need to escape from corny routine, need to seeking for new experience and novelty, need to have esteem or presetting to the new place, need to learn the culture, nationality, and different way of life, and need to create social interaction. Pull motivations was the motive created by tourist attractions that attract the tourists to travel in particularly destinations and depended on the characteristic of each tourist attraction that could responded the tourists needs such as the interesting of tourist attractions, convenient for transportation, famous destinations, provide various activities, provide tourist information, image of the destination etc. (Dann, 1977;Crompton,1979). The attractivetourist attraction required not only the beauty but must consisted with various amenities as bridge, road, and airport including other facilities such as accommodations, restaurants, and public relation the information and image of the destinations to attract or motivate the tourists to travel (CeeGoossens, 2000).

Solomon (2009) reported that motivation was the cause of human behavior. People might travel for enjoyment and visit their relatives and friends including participate in tourism activities,festival, or educational activities to seeking different culture. Therefore, tourists motivation specified the reason that the tourists decide to select the destinations and activities.

Marketing Mix

WeeraratKijlertphairoj (2004) explained the characteristic of service marketing as the internal marketing that represented to train and motivate the staffs in hospitality business. The purposes of service marketing were to establish relationship with customers including skillful staffs to support service providing and create customer satisfaction due to that staffs represented to the image of the organization and interactive marketing could create the reliable quality service and the quality could be accepted or not depends on customer satisfaction. Marketing mix basically consisted with 4P’s as product, price, place, and promotion but service marketing mix would be difference. In 1996, Zeithaml and Bitnerpresented the concept of service marketing mix that applied from 4P’s by added people, process, and physical evidence and called 7P’s. According to Kotler (1997), hospitality business required to use marketing mix consisted with 1) product/service that could be tangible product or intangible product 2) price described as the specification of business income or value 3) place defined as the activity concerned with environment or atmosphere that presented the service to the customers and should focused on location and channels 4) promotion was the significant tool to communication with service users purposed to inform news or persuade people that could create the attitude and buying behavior 5) people or employees required to have positive attitude, skillful, creativity, could tentative solving, and could create the value to the organization 6) physical evidence and presentation was the creation and present the physical characteristic to the customers purposed to establish the overall organization value including appropriate grooming, polite and gentle gesture, prompt service, or provide other advantages that the customers should receive and 7) process defined as the activity concerned with method and service operation that presented to service users purposed to provide prompt and accurate service and create customer satisfaction.

According to the literature review about Thai Boxing, tourism and tourist motivations, and marketing mix, the theories could establish conceptual framework as Picture 1. The concept of marketing mix (7’P) consisted with product, price, promotion, people, and physical evidence related to push and pull motivations and these variables conducted to the hypothesis:



Picture 1 conceptual framework

Hypothesis 1: Product has positive relationship with push motivations.
Hypothesis 2: Price has positive relationship with push motivations.
Hypothesis 3: Promotion has positive relationship with push motivations.
Hypothesis 4: People has positive relationship with push motivations.
Hypothesis 5: Physical evidence has positive relationship with push motivations.
Hypothesis 6: Product has positive relationship with pull motivations.
Hypothesis 7: Price has positive relationship with pull motivations.
Hypothesis 8: Promotion has positive relationship with pull motivations.
Hypothesis 9: People has positive relationship with pull motivations.
Hypothesis 10: Physical evidence has positive relationship with pull motivations.

Research Methodology

This research is cross-sectional survey purposed to examine the marketing mix factors related to push and pull motivations of foreign tourists to participate Thai Boxing activities in Phuket Province, Thailand. The data collected from178 foreign tourists who participated Thai Boxing class, training Thai Boxing, competing Thai Boxing fight, and participate Thai Boxing show by using face to face questionnaire. The sample selected by convenience sampling and collected the data from July to December 2017. The confidence of the whole questionnaire is obtained by Alpha coefficient which is found be 0.972.

Results Responses

According to the data collecting from 178 foreign tourists, the result found that 55.2 percent of the sample were male aged 29 - 34 years (37.1 percent) used to visit Phuket Province more than one time (59.6 percent) and viewed Thai Boxing show more than one time (53.9 percent). Most of foreign tourists experienced to participate Thai Boxing activities as 40.4 percent participated Thai Boxing class, 28.1 percent training Thai Boxing, 11.8 percent competing Thai Boxing fight, and 5.1 percent were professional Thai Boxers as shown in Table 1.

	N	Percent
Gender		
Male	124	69.6
Female	53	29.8
Other	1	0.6
Age		
17-22 year	17	9.5
23-28 year	53	29.8
29-34 year	66	37.1
35-40 year	35	19.7
41-48 year	7	3.9
Visit Phuket		
First time	72	40.4
More than 1 time	106	59.6
View Thai Boxing Show		
First time	82	46.1
More than 1 time	96	53.9
Participate Thai Boxing Activities		
Competing in Thai Boxing fight	21	11.8
Training Thai Boxing	50	28.1
Participate Thai Boxing class	72	40.4
Professional Thai Boxer	9	5.1

Analysis of Push and Pull Motivations

Table 2: Mean and SD values of push motivation items

Factor	Mean	SD	Level
Required to participated Thai Boxing activities.	3.01	1.573	Neutral
Interesting to be professional Thai Boxers.	3.20	1.306	Neutral
Prefer/like Thai Boxing.	3.60	1.321	Agree
Required to have be strong.	3.39	1.337	Neutral
Required to learn martial arts and self-defense.	3.59	1.228	Agree
Required to have unique and good-looking gesture.	3.55	1.414	Agree
Required to learn Thai cultural martial arts.	3.60	1.375	Agree
Required to be famous.	3.17	1.392	Neutral
Total	3.39	1.368	Neutral
Cronbach's Alpha = 0.907			

Table 3: Mean and SD values of pull motivation items

Factor	Mean	SD	Level
Thai Boxing could establish income and generate career.	2.66	1.171	Neutral
Was induced by friends and family.	3.11	1.244	Neutral
Thai Boxing was famous world-class activities.	3.31	1.221	Neutral
Thai Boxing was the source of income.	3.01	1.214	Neutral
Skillful promoter/Thai Boxing manager.	3.29	1.237	Neutral
Thai Boxing was popular in foreigner.	3.31	1.213	Neutral
Thai Boxing could apply to the actual practice.	3.51	1.254	Strongly agree
Thai Boxers were famous in world-class level.	3.45	1.280	Neutral
Total	3.21	1.229	Neutral
Cronbach's Alpha = 0.862			

The analysis of correlation between the product, pricing, promotion, physical, and service employee between with pull motivation by Pearson correlation coefficients as shown in Table 4.

Table 4: Bivariate analysis: Pearson correlation

	Product	Pricing	Promotion	Service Employee	Physical	Push motivation
Product	-					
Pricing	.815**	-				
Promotion	.822**	.734**	-			
Physical	.797**	.792**	.765**	-		
Service employee	.865**	.809**	.761**	.743**	-	
Push motivation	.726**	.736**	.671**	.802**	.651**	-

Several Pearson correlations for the independent, dependent and control variables have been computed. Table 4 shows that the strongest correlations with the dependent variable (push motivation) have been found with regard to service (H2, r=.802, p<.001), pricing (H2, r=.746, p<.001), product (H1, r=.726, p<.001), promotion (H3, r=.671, p<.001). The same is applied to the product (H5, r=.651, p<.001) devoted to push motivation are for the five samples. Most of the correlation coefficients have the expected sign with five independent variables evidencing a positive correlation with the dependent variable.

The analysis of correlation between the product, pricing, promotion, physical, and service employee between with push motivation by Pearson correlation coefficients as shown in Table 5.

Table 5: Bivariate analysis: Pearson correlation

	Product	Pricing	Promotion	Service employee	Physical	Push motivation
Product	-					
Pricing	.815**	-				
Promotion	.822**	.734**	-			
Physical	.797**	.792**	.765**	-		
Service employee	.865**	.809**	.761**	.743**	-	
Pull motivation	.712**	.746**	.737**	.746**	.740**	-

Several Pearson correlations for the independent, dependent and control variables have been computed. Table 5 shows that the strongest correlations with the dependent variable (pull motivation) have been found with regard to pricing (H7, r=.746, p<.001), service employee (H9, r=.746, p<.001), physical (H10, r=.740, p<.001), promotion (H8, r=.737, p<.001). The same is applied to the product (H6, r=.712, p<.001) devoted to pull motivation are for the five samples. Most of the correlation coefficients have the expected sign with five independent variables evidencing a positive correlation with the dependent variable.

Stepwise multiple regression analysis of product, pricing, promotion, service employee, and physical affected to push motivation as show in table 6.

Table 6: Results of stepwise regression analysis

Variable	**b**	***SE_b***	***β***	**t**	**Sig**
Independent variables					
Service employee	.518	.064	.599	8.051	.000
Pricing	.263	078	.251	3.367	.001
Dependent variables					
Push motivation					
Note: R^2 = .666; adjusted R^2 = .662; F= 174.086; p<.000					

The stepwise multiple regression analysis explained obvious understand of the determinants that significantly contribute to each desired push motivation measure within a marketing mix context. Preliminary statistical testing ensured compliance with regression assumptions. A discussion of each stepwise regression equation and provides insight into the key determinants of each desired push motivation measure within a marketing mix context.

The result represented that the variables that could forecasted desired push motivation in Phuket at statistical significance .01 are service employee (β =.599, p < 0.000), and pricing (β =.251, p < 0.000). These variables could forecast desired push motivation 66.6% (R^2 = 0.666) and Std. Error of the Estimate = .621. This study presented the push motivation that the foreign tourists preferred to Thai boxing activity in Phuket Province based on the variation of these two variables at 66.6% and 33.4% based on other variables.

Stepwise multiple regression analysis of product, pricing, promotion, service employee, and physical affected to pull motivation as show in table 7.

Table 7: Results of stepwise regression analysis

Variable	**b**	***SE_b***	***β***	**t**	**Sig**
Independent variables					
Pricing	.182	.074	.211	2.459	.000
Promotion	.203	.065	.241	3.144	.000
Service Employee	.163	.059	.230	2.771	.000
Physical	.180	.067	.218	2.697	.000

Dependent variables					
Pull motivation					
Note: R^2 = .667; adjusted R^2 = .660; F= 86.794; p<.000					

The result represented that the variables that could forecasted desired pull motivation in Phuket at statistical significance .01 are pricing (β =.211, p < 0.000), promotion (β =.241, p < 0.000), service employee (β =.230, p < 0.000), andphysical (β =.218, p < 0.000). These variables could forecast desired pull motivation 66.7% (R^2 = 0.667) and Std. Error of the Estimate = .511. This study presented the pull motivation that the foreign tourists preferred to Thai boxing activity in Phuket Province based on the variation of these four variables at 66.7% and 33.3% based on other variables.

Discussion

The study of marketing mix related to tourism motivations of international tourists to participate Thai Boxing activity in Phuket Province represented that service marketing mix which had positive relationship with push and pull motivations consisted with 2 issues as:

People had positive relationship with push motivation of foreign tourists who required additional techniques or seeking new experience. The tourists fulfilled their needs by participate Thai Boxing fight that according to LertpoonParasakun (n.d)who compared Thailand tourism push and pull motivations from European tourists, American tourists, and Chinese tourists and found that the highest level of tourist motivation was the fulfillment of their needs and secondly was cultural and historical learning. Thai Boxing consisted with philosophy, cultural, and historical values including establish national pride and could build the strong bodies.

Price had positive relationship with push motivation of foreign tourists due to they found that accommodation rate and expenses for Thai Boxing activities were reasonable. The tourists perceived that they could stay and training in long terms and the they could practicing both morning training and evening training that according to RaweewanPloyrungroj (2015) who studied Motivations and On-site Experiences of Foreign Tourists in Participating Volunteer Tourism in Thailand: case study Bangkok and found that to participating volunteer tourism, it cause of the motivation based on personal advantage. Therefore, push motivation could described as psychological factors or internal needs within the tourists that motivated them to participate Thai Boxing activities.

Price, promotion, people, and physical evidence had positive relationship with pull motivation of foreign tourists due to the tourists were attracted by Thai Boxing activities in Phuket Province that consisted with folklore, culture, geography, and good atmosphere. These characteristic motivated the tourists to visit destination that according to AtcharapornPlaengmarn, (2015) studied South East Asia Travel Destination and Travel Motivation of Tourists and found that the tourists were attracted to visit destinations by pull motivation based on the interesting characteristic of the destinations. SaengduenRatinthorn (2012) studied The Push and Pull Factors Affecting to The Decisions of Chinese Tourists in Choosing Thailand as Their Destination and the result represented that pull motivation affected to Chinese tourists were Thai food, Thai culture, beautiful scenery, attractive beach and seashore, and prepared tourist information.

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THE DECISION MAKING PROCESS TOWARDS THAI TRADITIONAL MASSAGE OF THE GOVERNMENT MEDICAL HEALTH SERVICE IN SONGKHLA PROVINCE

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ABSTRACT

This research studied the decision making process towards Thai traditional massage of the government medical health service in Songkhla Province. The objective of this research was to investigate two aspects, which firstly was to study decision making process and, secondly was to study the factors were to influenced on the decision making process towards Thai traditional massage of the government medical health service in Songkhla Province. The research populations were the customers who used Thai traditional massage of the government medical health service. The closed-ended questionnaires were distributed to 400 samples with specific sampling. The data were statistically analyzed to determine mean, standard deviation, frequency, and percentage.

The findings of this research are as follows. Firstly, the perception of want to use service was the most important for the decision making process towards Thai traditional massage of the government medical health service of the customer who used to choose Thai traditional massage service. Secondly, the samples of this research had agreed with marketing mix strategy influence for the decision making process, its were process method that the most important factor, people, product, physical, place, price, and promotion, respectively.

Keywords: Thai massage, decision making process, service marketing mix

INTRODUCTION

Thai massage is the Thai precious wisdom due to Thai massage was using for medical treatment from the past until present day and represented Thai people way of life to supportive each other in the family. According to the model of Healing Arts Practices Act, massage was not only medical treatment but classified as health maintenance and cure process by using artistic touch and based on principles between service providers and service users (Department of Thai Traditional and Alternative Medicine, 2017).Thai massage is one of the acceptance alternative medicines that could cure and heal many diseases, therefore Department of Thai Traditional and Alternative Medicine provided Thai massage course and continuous development along with academic standard and attended to maximize the skills (Department of Thai Traditional and Alternative Medicine, 2017).

Thai massage is the service represented to local wisdom based on local culture and knowledge and became favorite service of the service usersdue to healthy is Thai people trend in present day including government and private sectors campaign that support health and wellness. Thai massage is one kind of acceptance medical treatment both Thai and foreign, therefore Thai massage is interesting business that could generated the income to the country. Kasikorn Research (2015) reported that Thai massage generated income approximately 150,000 million Baht in 2012 both in Thailand and other countries. The stressful environment for example, the crisis in 2011 including economic crisis, political crisis, and social crisis especially flooding crisis were the cause of stress, anxiety, and pressure for physical and mental health (Monsicha Sukchom and Ubolwan Rod-iam, 2013). The others factors effected to the health including muscle aches, fell off the pillow, and deteriorate health in elderly. These causes of deteriorate health influenced Thai people to emphasize their health and affected to the increasing of health and wellness service, especially Thai massage service in hospital. Thai massage service in hospital provided health treatment including safety and reliable service due to the treatment service according to Ministry of Public Health policy that determined every public hospitals must provide standard Thai massage.

Nevertheless, the global recession effected to purchasing products or services behavior, for example the increasing of price sensitive, decreasing of purchasing power, and the customers considered the quantity and quality compared with the price (Warapong Thakanun and Thanasuwit Thabhiranrak, 2016). Therefore, the entrepreneurs should focus to the competitiveness to attract more customers to increase profit by using marketing strategy. Thai massage business must explore and apply various strategies to find the necessary strategy and create competitive advantage.

Therefore, the study of decision making process to use Thai massage in public health inSongkhla Province purposed to examined the decision making process of the customers to use Thai massage service and to studied market factors influenced to customers to use Thai massage service in public health in Songkhla Province. The result of this study could apply to create marketing strategy and increase service quality in the future.

REVIEW OF LITERATURE

Thai massage

Thai Traditional Medicine (1999) described the meaning of Thai massage as the medical process concerned with diagnose, healing, cure, or prophylactic or supporting human or animal health, midwifery, Thai massage, and the description including Thai traditional medicine making and medical equipment making based on the knowledge or traditional books. Healing Arts Practices Act B.E. 2542 (1999) described Thai massage as diagnosis, cure, prophylactic, supporting health, and rehabilitation by using acupressure, rolling, squeeze, touching, bending, compression, steam, and others treatments concerned with Thai massage arts or using medicines under the laws. Thai traditional medicine divided into 2 types 1) massage for treatment and cure and the masseur required to have Practice of the Arts of Healing Act License and 2) massage for health is the relaxation of the muscle andrelease the pain by using acupressure, rolling, squeeze, touching, bending, compression, steam, and others treatments concerned with Thai massage arts.

Department of Thai Traditional and Committee for Standard Development of Thai Traditional in Public Health (2010) determined 5 standards of Thai massage service provider under public health 1) place, equipment, tool, and environment 2) staffs 3) operation 4) quality control and 5) service management. The standard of Thai massage for public health divided into 2 levels as hospital standard and public health standard.

The Buying Decision Process

Kotler (1997) explained that buying decision process was the personal assessment of the alternative to respond the objective and was the part of different lifestyle behavior. The reasons that action or behavior of each person towards selecting products and using products or services via decision were to respond customer needs and to maximize customer satisfaction. The process including specify the problems, seeking the information, estimate the choices, buying decision making, and estimate the result after purchasing. Nevertheless, AdulJaturongkakul*et.al.*, (2003) described that buying decision process could separate into 3 parts 1) the pre purchase stage was the decision to purchase product and use service and this stage could occurred before purchase and including buying situation, news or information of products or services, seller specification, and influencers (family, friends, colleagues etc.) 2) Services Encounter Stage was the evaluation stage that customer satisfied or dissatisfied with products or services based on received experience and could affected to buying intention in the future both positive and negative and 3) The Post purchase Stage was the contact between buyers and sellers, whilst Kotler (2003) specified that buying decision process included fivesteps as needs recognition, information seeking, evaluation the alternatives, purchase decision, and post-purchase behavior that according to McGoldrick and Douglas, (1983) who explained that five stage buying decision process affected to organization’s decision making activities due to the organization operated with decision making within organization context and factors of an organization, especially retail business or distributors. Comegys*et. al.*, (2006) studied five stage buying decision process for online shopping of the ‘Net Generation’ university-aged student, from two of the world’s most advanced IT nations with the greatest potential in e-commerce: Finland and the USA and found that five stage buying decision process had an important role to buying behavior and continuous increasing. For example, needs recognition, evaluation, and purchase decision had equal strong relation to different gender and buying process, whilst information search affected to female more than male. In 2006, Kotler and Kelle reported that buying decision process started from problem or needs recognition that the customer recognized the different between the reality and their needs and could described as the internal needs. Furthermore, demography factors such as age, gender, income, nationality, education level, family size, and marital status, also influenced to buying decision process. Ticomporn Phetrawech (2016) studied marketing mix affected to decision making for cinema choosing and found that marketing mix influenced to decision making to purchase service and also found other relating factors, nevertheless marketing promotion was the significant factor that motivated purchase decision under the condition that if the cinema increased the marketing mix, thecustomer tended to increasing to choose the cinema.

Marketing Mix

Gustafsson and Roos (2005) described the service marketing as “Service is a perspective on value creation rather than a category of market offerings” and Huotari and Hamari, (2012) explained the service marketing is the value of a service is determined solely by customer’s subjective experience, as service providers can make only value propositions. Chaisompol Chaoprasert(2003)clarified the service marketing mix was different from marketing mix that consisted 4P’s as product, price, place, and promotion (McCarthy, 1960) but in 1981 Booms and Bitner applied the marketing mix by added people, process, and physical evidence and called 7P’s. Siriwan Sereerat (1998) referred to service marketing mix of Kotler (1997) that it was the concept concerned with service business consisted with 1) product/service both tangible and intangible 2)Price was the object to determined income to the business that could be money or value 3) place was the activities concerned with atmosphere or environment to present the service to customer and should attended to the location and channels 4) promotion was the important tool to communicate with the service users purposed to public relation or motivation the customer to use the provided service 5) people or employee should be skillfulness, had positive attitude, could tentative solving, and could create value to the organization 6) physical evidence and presentation represented the physical characteristic of the business to the customers by created overall quality both physical products and services to increase value including staff grooming, polite and gentle staffs, provide quick service, and other values that the customer could perceived and 7) process was the activity concerned with method and operation provided to the customers purposed to provided proper and in time service that could create customer satisfaction.

METHODOLOGY

This study consisted with two variables as five stages buying decision process and marketing mix (7P’s).Marketing mix (7P’s) variable included product, price, place, promotion, people, process, and physical evidence. Variable of buying decision process for using Thai massage consisted with Methodology needs recognition, information seeking, evaluation the alternatives, purchase decision, and post-purchase behavior.

This survey applied purposive sampling from 400 Thai massage service users from public health in Songkhla Province based on Yamane (1973).

The questionnaire comprised 3 parts as 1) general information of the sample (multiple choices) including gender, age, education level, occupations, average income per month, primary health problems, and purpose for using Thai massage service 2) 28 questions of marketing mix factors information consisted with product, price, place, promotion, people, process, and physical evidence based on 5 levels interval scale including 5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, and 1 = strongly disagree and 3) 19questions concerned with buying decision process to using Thai massage service consisted with needs recognition, information seeking, evaluation the alternatives, purchase decision, and post-purchase behavior based on 5 levels interval scale including 5 = most important, 4 = important, 3 = moderately important, 2 = less important, and 1 = least important.

The data analyzed by SPSS version 17.0 based on descriptive statistic including frequencies distribution, percentage, mean, frequencies, standard deviation, and inferential statistics. The hypothesis testing applied t-test and One-way Anova and specified the statistical significance at 0.05.

RESULT

Part 1: general information of the sample.

The general information of 400 samples including gender, age, education level, occupations, average income per month, primary health problems, and purpose for using Thai massage service analyzed by frequency and percentage shown in Table 1.

Table1 represented the quantity and percentage of general information of the samples.

General Information	Quantity	Percentage
1.Gender		
Male	137	34.25
Female	263	65.75
2.Age		
Lower 25 years	19	4.75
25 – 30 years	30	7.50
31 - 35 years	71	17.75
36 - 40 years	89	22.25
41 - 45 years	67	16.75
46 - 50 years	67	16.75
51 - 55 years	41	10.25
Over 55 years	16	4.00
3.Maximum education level		
Lower bachelor degree	101	25.25
Bachelor degree	238	59.5
Over bachelor degree	61	15.25
4.Occupations		
Government officials/ State enterprise employee	121	30.25
Company employee	122	30.5
Business owner/ self-employed	60	15.00
Housewife	21	5.25
Agriculturalist	36	9.00
Employee	40	10.00
5.Average income per month		
Lower 10,000 Baht	50	12.50
10,000-20,000 Baht	165	41.25
20,001-30,000 Baht	107	26.75
30,001-40,000 Baht	59	14.75
40,001-50,000 Baht	14	3.50
Over 50,000 Baht	5	1.25

General Information	Quantity	Percentage
6.Primary health problem		
Muscle aches	167	41.75
Joint or bone pain	114	28.50
Paralysis	20	5.00
Backache or other body parts pain	99	24.75
7. Purpose to using Thai massage service		
For relaxation	179	44.75
For disease treatment	114	28.50
For supportive health	79	19.75
For skin caring and blood circulatory system maintenance	28	7.00

Part 2: marketing mix factors

The information of marketing mix factors of Thai massage service in public health in Songkhla Province from the 400 samples who used Thai massage service as shown in Table 2.

Table 2 marketing mix factors

Marketing Mix	$\bar{X}$	S.D.	Level
Product			
1. Various Thai massage program	4.19	0.682	Agree
2. Quality herbal sand equipment	4.06	0.693	Agree
3. Various massage oils	4.17	0.666	Agree
4. Reliable organization	4.14	0.714	Agree
Overview for product	4.14	0.456	Agree
Price			
1. Appropriate price.	4.13	0.654	Agree
2. Proper paying method.	3.93	0.670	Agree
3. Similar price compared with other organizations or private sector Thai massage shops.	4.11	0.697	Agree
4. The service users could reimbursement for medical billing or service using.	3.79	0.706	Agree
Overview for price	3.99	0.399	Agree
Place			
1. The place is proportional to provide service.	4.21	0.643	Strongly agree
2. Sufficient parking for service users.	3.87	0.709	Agree
3. Sufficient service rooms.	3.99	0.690	Agree

Marketing Mix	$\bar{X}$	S.D.	Level
4. The location is convenient for transportation.	4.24	0.704	Strongly agree
Overview for place	4.08	0.410	Agree
Promotion			
1. Offer discount for frequent customers.	3.89	0.683	Agree
2. The staffs suggest Thai massage program and provide helpful communication to customer.	4.05	0.636	Agree
3. Offer complimentary service or optional service.	3.90	0.672	Agree
4. Provide advertising via printing media such as magazine, journal, or internet.	3.85	0.697	Agree
Overview for promotion	3.92	0.399	Agree
People			
1. The staffs have clean and polite grooming.	4.26	0.662	Strongly agree
2. The staffs are friendly.	4.10	0.672	Agree
3. The staffs are skillful and effective to provide Thai massage.	4.29	0.566	Strongly agree
4. The staffs explain the advantage of Thai massage or suggest Thai massage equipment.	4.16	0.607	Agree
Overview for people	4.20	0.343	Agree
Process			
1. Accurate steps to provide Thai massage.	4.17	0.666	Agree
2. The service provider create relax atmosphere.	4.37	0.578	Strongly agree
3. Prepare clean cloth for the customers.	4.30	0.629	Strongly agree
4. The staffs provide rapid service.	4.10	0.652	Agree
Overview for process	4.24	0.346	Strongly agree
Physical evidence			
1. The environment and atmosphere support the good health such as cleanness and airy.	4.25	0.665	Strongly agree
2. Thai massage rooms are clean, private, and restful.	4.19	0.635	Agree
3. Sufficient accommodations such as waiting chairs, drinking water, and coffee for the relatives of service users.	4.01	0.641	Agree
4. Public health provide appropriate appointment system.	3.95	0.704	Agree
Overview for physical evidence	4.10	0.373	Agree

According to Table2, the result represented that most of customers who used Thai massage service in public health in Songkhla Province agree that product affected to buying decision process ($\bar{X}$ = 4.14, S.D. = 0.456), agree that price affected to buying decision process ($\bar{X}$ = 3.99, S.D. = 0.399), agree that place affected to buying decision process ($\bar{X}$ = 4.08, S.D. = 0.410), agree that promotion affected to buying decision process ($\bar{X}$ = 3.92, S.D. = 0.399), agree that people affected to buying decision process ($\bar{X}$ = 4.20, S.D. = 0.343), strongly agree that process affected to buying decision process ($\overline{X}$ = 4.24,S.D. = 0.346), and agree that physical evidence affected to buying decision process ($\overline{X}$ = 4.10, S.D. = 0.373) respectively.

Part 3: buying decision process factors.

Buying decision process of Thai massage service users in public health in SongkhlaProvincecould separate into 5 factors as needs recognition, information seeking, evaluation the alternatives, purchase decision, and post-purchase behavior and the result of survey represented in Table 3.

Table 3 buying decision process factors to use Thai massage service.

Buying decision process to use Thai massage service	$\overline{X}$	**S.D.**	**Important level**
Needs recognition stage			
1. Thai massage could cure your primary health problem.	4.38	0.602	Most important
2. The service users require the accurate and safe Thai massage service.	4.54	0.524	Most important
3. The service users require rapid and convenient service.	4.44	0.559	Most important
Overview of needs recognition stage	4.45	0.332	Most important
Information seeking stage			
1. The service users compare Thai massage service providers information before decision before using.	4.05	0.655	Important
2. The service provider that you use is famous and wee-known.	4.17	0.664	Important
3. You discuss with family or friends before decision to use any service provider.	4.14	0.658	Important
Overview for information seeking stage	4.12	0.387	Important
Evaluation the alternatives stage			
1. You select public health that provide Thai massage you rely that could cure and maintain your primary health.	4.35	0.594	Most important
2. You select Thai massage service providers that have doctor and specialist.	4.31	0.582	Most important
3. Thai massage service provider is reliable and standard.	4.46	0.560	Most important
4. You select Thai massage service provider that could response in case of any mistake.	4.43	0.561	Most important
Overview for evaluation the alternatives stage	4.38	0.286	Most important
Purchase decision stage			
1. The staffs are friendly and willing to serve the service.	4.36	0.575	Most important
2. The staffs could answer the question about primary health concerned with massage or any treatment.	4.30	0.571	Most important
3. Thai massage could cure, maintain, and treat primary health problem.	4.40	0.562	Most important
4. Privacy policy of the service users is reliable.	4.52	0.530	Most important
5. The staffs are appropriate attentive the service users even though they do not request.	4.28	0.586	Most important
Overview for purchase decision stage	4.37	0.243	Most important
Post-purchase behavior stage			

Buying decision process to use Thai massage service	$\bar{X}$	S.D.	Important level
1. You satisfy the quality of Thai massage provided by public health.	4.33	0.617	Most important
2. You will absolutely repurchase Thai massage service in public health.	4.24	0.612	Most important
3. You will recommend Thai massage service in public health to other people.	4.33	0.564	Most important
4. You will use Thai massage service even though your expense is increase.	4.25	0.600	Most important
Overview for post-purchase behavior stage	4.29	0.308	Most important

According to Table 3, the result represented the average and standard deviation of the important of buying decision process towards Thai massage service using in public health in Songkhla Province from 400 samples and encountered that most of Thai massage service users found that needs recognition stage was most important to use Thai massage service ($\bar{X}$ = 4.45,S.D. = 0.332), information seeking was important to use Thai massage service ($\bar{X}$ = 4.12, S.D. = 0.387), evaluation the alternatives stage was most important to use Thai massage service ($\bar{X}$ = 4.38,S.D. = 0.286), purchase decision stage was most important to use Thai massage service ($\bar{X}$ = 4.37, S.D. = 0.243), and post-purchase behavior stage was most important to use Thai massage service ($\bar{X}$ = 4.29, S.D. = 0.308) respectively.

CONCLUSION

The result of this study represented that marketing mix process affected to Thai massage service using that related to marketing mix concept of Chaisompol Chaoprasert (2003) who explained that service process was the significant marketing mix that required effective staffs or trendy tools to create service providing process due to Thai massage was the treatment based on human anatomy and healing theory. Thai massage process have to provide accurate posture and carefulness while massage or treatment according to the result of this study that represented the samples attended to process due they required safety and reliable service in public health.

The result of buying decision process to use Thai massage service in public health in Songkhla Province described that most of the service users attended needs recognition at most important level due to needs recognition represented the purposed of Thai massage service using such as muscle ache, paralysis, and other health problems. Therefore, the samples had to recognized their health problem first including they required safety, convenient, rapid, and reliable service from public health. The result according to AdulJaturongkakul*et.al.*, (2003) who found that pre-purchase stage included decision to purchase products and use services depended on personal needs that were significant due to it could influenced to the alternatives comparison of the customers. The samples of this study recognized their needs and realize the purpose to use Thai massage service whilst they acknowledged their primary health problem due to if there was any mistake, it could dangerous to their bodies.

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THE CIRCUMSTANCE OF HOUSEHOLD DEBT AND THE CREATION OF FINANCIAL DISCIPLINE FOR CREATING HOUSEHOLD SUFFICIENT ECONOMY

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Abstract

This research studied the circumstance of household debt and the creation of financial discipline for creating household sufficient economy. The objectives of this research were to investigate the factors and financial behavior that resulting in household debt and to investigate the guidelines for solving the household debt by creating the financial disciplines for being sufficient. The closed-ended and opened ended questionnaires were distributed to the research samples which were 337 households living in Thale-Noi sub-district, Khuan-Khanun district, Phatthalung province,Thailand. The data were statistically analysed to determine mean, standard deviation, frequency, percentage, and multiple regression analysis. The Exploratory Factor Analysis was performed using the Principal Component Analysis (PCA). The findings of this research firstly showed that the majority of problem and causes of household debt was the increasing of household consumption which was rated at high level ($\bar{X}$=4.08), followed by the reason of household's investment demand ($\bar{X}$= 3.77), easier accessibility to the informal debt ($\bar{X}$= 3.75), imbalance between uncertain incomes and the household consumption cost ($\bar{X}$= 3.70), and the changing consumption behaviours among new generations ($\bar{X}$= 3.69), respectively. Furthermore, the creating financial discipline in order to solve household debt problems were respectively presented as followed: 1) Saving money consistently ($\bar{X}$= 3.78), 2) recognizing the importance of emergency funds for the sole purpose ($\bar{X}$= 3.73), 3) reinvesting for increasing income ($\bar{X}$= 3.63), 4) applying the sufficiency economy philosophy in money expenses ($\bar{X}$= 3.61). The approaches to solve the household debt problems were respectively shown as the followings 1) giving education in money management, liabilities, and savings money ($\bar{X}$=4.22), 2) distributing income and promoting the community careers ($\bar{X}$=4.07), 3) eliminating unjustified credit from informal creditors ($\bar{X}$=4.01), 4) the community participation, encouraging the community to recognize and apply the sufficiency economy philosophy in households ($\bar{X}$=3.98), and 5) enhancing the private investment to increase the community employment ($\bar{X}$=3.93), respectively. Another aspect was the household stability found among the household, the study showed that 39.2 percent of the sample had household liquidity. On the other hand, 61.4 percent of sample had no ability to pay monthly debts. Lastly, the study of the financial freedom showed that 52.2 percent of the sample could live on their own whereas 95.8 percent of the samples had no financial freedom. According to the hypothesis testing, it presented that the average of monthly income, the burden of household debt, and the average of monthly asset income positively impacted on the survival ratio; while the average monthly expenses and the number of household members negatively impacted on the survival ratio at the significant level of 0.05. Additionally, the result could predict the survival ratio of households was 59.4 (Adjusted R^2= 0.594) while household factors correlated with high survival ratio based on correlation (R=0.774). The results of grouping variable analyzed from principal component analysis of 20 variables led to the new grouping of 6 mutual factors. These mutual factors were used to describe the relationship of the independent variables affecting the dependent variables which could determine 64.42% percent of the variance of all variables.

Keywords: Household Debt, Financial Discipline, Sufficient

Introduction

Sufficiency Economy philosophy defined as the concept and principle for livelihood created by His Majesty King Bhumibol Adulyadej of Thailand in 1974. The concept of sufficiency economy attended to self-sufficiency to established the balance and stable livelihood and happiness based on the middle path that not too much or not too little consumption and did not incur debt. The current situation of economy in Thailand was unstable and economic fluctuation that different from the past and effected to economic and social stability. In 2011, National Statistical Office reported that average household income in Thailand was 23,544 Baht mostly income came from working, average household expense was 17,861 Baht and most of the expense was food and beverage expense, and found that there were 56.9 percent household debt averaged 136,562 Baht per household and most of them were household expense debt. The household debt happened in many countries both developed country and developing country.

The household debt problem in Thailand and worldwide effected to the growing of household debt in high level and affected to decrease household cash flow due to people need to spend their income for debt more than for household expense and be prudent to spending. Meanwhile, the financial institutions were anxious about the debt quality that could become problem in the future, therefore they established strict policy for issuing the loan and effected to restrain the purchase decision for products and services and continue effected to business investment. According to the information from Bank of Thailand, the household debt was 79.8 percent of GDP in the end of 2016 and a little bit decrease in first quarter of 2017 (Bank of Thailand, 2017) whilst the ratio of population with debt, amount of debt per person, and ratio of non-performing loan (NPL) with population's age and types of the loans represented that Thai people applied personal loan more than other loans, especially working age population. The data presented that 30 percent of working age population applied personal loan compared with 17 percent of all Thailand's population. Furthermore, working age population was classified as highest NPL ratio calculated as 20 percent compared with 15 percent of all borrowers (Somaras Chantarat *et al*., 2017). The increasing of NPL problem could affected to population being including economic condition. If the household increase debt in high level, the ability to spending household expense would be decrease that effected to lower standard of living cause of lack of liquidity and the following problem could be tension problems, crimes, family problems, and suicide. The solution to solve household debt problem was the government should attended to the households which venture with any risks due to most of the income would spend for debt substitute household expense and buying residence and the members in household required to change their spending behavior by using Sufficiency Economy philosophy to establish financial discipline by established household account to reduce spending for luxury goods.

Therefore, the method to create financial discipline was to enhance financial management technique such as spending plan, pay yourself first, and avoid unnecessary payment. Nevertheless, the sufficiency economy (Chirayu Isarankun Na-Ayuthaya, 2005) attended to the sufficient principle, reasonable uses, and self-immunity that could conducted to peaceful life.

Review of literature

This study is based on several relevant principles, such as the cause of household debt, debt financing stimulus, personal financial management, and the theory of demand for money. Each concept is explained as follow:

1. The cause of household debt

1.1) According to Permanent Income Hypothesis theory, Friedman (1956) explained the consumption smoothing framework that household could applied for the loan to maintain necessary consumption. In the period that household gained less income and insufficiency with expense, the household could borrowed money for consumption including applied the loan for investment and operated business.

1.2) Household debt and business cycle in expansion stage affected to continuing economic activity and other business operations including financial institutions willing to provide the loan to private sector that affected to household and business could easily access to the loan.

1.3) Financial access referred to the development of financial system, various financial institutions, and the convenient to access financial services including household better recognize finance could affected to the increasing financial access of the household.

2. Debt financing stimulus

2.1) The low interest since 2009 was significant factor affected to the increasing of household debt from consumption and investment increasing.

2.2) The stimulus package of the government concerned expense and increase population income by using tax instruments and provided low interest loan to encouraged people to increase spending via the first-car tax scheme, first-house tax scheme, agriculturist's credit card, and low interest loan from the bank of Thailand.

2.3) The loan issuing competitions of financial institutions supported the stimulus package of the government whilst the could expanded the target group of customers and these stimulus was the important mechanism to increase household debt. The financial institution applied various and continuous offensive marketing strategy and presented technology and innovation to expanded market distribution via internet and smart phone to attach the service users based on convenience and privacy policy.

3. Personal financial management of Ratchanee Wongjan (2010) who described the financial management method or personal financial planning that was very significant method to created financial discipline consisted with the important financial skills as how to earn, how to save, how to spend, and how to invest. If there was some missing skill, the financial balance would be lost and tended to establish financial problem that could effect to the household.

4. The theory of demand for money of John Maynard Keynes (1936) explained 3 purposes of demand for money as for transaction motive, for precautionary motive, and for speculative respectively.

Research Methodology

This study is survey research purposed to examine factors and spending behavior were cause of household debt, and to report the solution to solve household debt problem based on establishing financial discipline that conducted to sufficiency economic.

Population and sample;

The population was a total of 2,113 households in Thale-Noi sub-district, Khuan-Khanun district, Phatthalung province, Thailand (National Statistical Office of Thailand, 2016). Population size was determined by probability since it is finite. Taro Yamane (1973) formula was applied and confidence level was set at 95%. Households were used as area sampling and stratified random sampling be specific households have debts, totaling to 337 samples. The data collecting consumed 3 months between January-March 2018.

Research instruments;

This research used survey as an instrument for data collection with both close-ended and open-ended questions and five rating scales. The likert scales by Rensis Likert and dummy variables with the scores ranging from 1 to 5 (1 = "Not important at all", 2 = "Not very important", 3 = "Moderate", 4 = "Important", and 5 = "Very important"). This survey applied questionnaire as research tool consisted with the household general information, financial position information and financial behavior, debt information and cause of household debt problem, financial discipline establishment information to solve household debt problem, and the solution to solve household debt problem, and recommendation. Reliability of the questionnaire was examined using Cronbach 's Alpha coefficient that yielded a value of 0.939 of 10 percent of the pre-test samples.

Data analysis was carried out using SPSS 17.0 statistical software to analyze the descriptive statistic (frequencies, percentage, mean, standard deviation) and the inferential statistic (multiple regression analysis and exploratory factor analysis was performed using the Principal Component Analysis (PCA))

Research results

The results from this study were summarized as follows:

1. The data analyzed the household general information and found that the sample had average household debt amount 5,127.74 Baht per month, average debt expense both principal and interest amount 5,218.16 baht per month, and average short-term debt amount 21,408.19 Baht per year. Most of the samples had average income from working per month amount 9,872.40 Baht, average revenue from the assets per month amount 664.69 Baht, average expense per month amount 11,302.97 Baht, and average saving per month amount 954.72 Baht respectively as shown in Table 1

2. The data analysis for financial position and financial behavior represented that 70.9 percent households had formal debt and 29.1 percent households had informal debt. The main cause of household

debt caused of consumption expense (26.4 percent), applied the loan for agriculture/fishery (29.7 percent), and applied the loan from Bank for Agriculture and Agricultural Cooperatives (58.8 percent). The purpose of saving was for debt repayment (41.8 percent). The household expense spent for food and beverage (non-alcohol) (15.5 percent). Most of the samples or 93.8 percent did not prepare household account and 95.5 had no part time job in household. The behavior caused of debt was spending more than earning (66.8 percent) as shown in Table 2

3. According to the variables of debt information and cause of household debt problem, the result found that all 20 variables had overall mean in high level (Mean=3.48). The top 5 factors consisted with higher level of household consumption (Mean=4.08), the demand for money to invest in household (Mean=3.77), Informal debt easier access than formal debt (Mean=3.75), unstable income and insufficient for household consumption (Mean=3.70), and the changing of consumption behavior (Mean=3.69) respectively, as shown in Table 3.

Table 1
Household general information of household head

Household general information	Number	Percent	Household general information	Number	Percent
1. Gender			6. Member in household (person) (X_2)		
Male	186	55.2	Minimum	2	
Female	151	44.8	Maximum	9	
2. Age (X_1)			7. Type of household		
Minimum (years)	30		Single Household	282	83.7
Average (years)	49.7		Expanded Household	55	16.3
Maximum (years)	65		8. Household members who have high level of dependence (X_3)		
3. Status			None	227	67.4
Single	19	5.7	Have (person)	110	32.6
Married	267	79.2	-Children	0-4	
Divorced/separated	27	8.0	-Elderly	0-2	
Spouse died	24	7.1	-Disabled persons	0-1	
4. Level of education			-Mental/Brain disorders	0-1	
Primary school	280	83.1	-Chronic patients	-	
High school/Diploma	45	13.3	9. Average monthly income from working (X_4)	9,872.40 (Baht)	
Undergraduate	12	3.6	10. Average monthly income from the assets (X_5)	664.69 (Baht)	
5. Current occupation			11. Average monthly expenses (X_6)	11,302.97(Baht)	
Fishery	150	44.5	12. Average monthly savings (X_7)	954.72 (Baht)	
Employee	97	28.7	13. Average monthly total debt (X_8)	5,127.74 (Baht)	
Bureaucrat/State enterprise officer	5	1.5	14. Average Principal and interest payments per month (X_9)	5,218.16 (Baht)	
Merchant	58	17.2	15. Average short-term debt (X_{10})	21,408.19(Baht)	
Agriculturist	14	4.2			
Self-employed	13	3.9			

Table 2
Financial position information and financial behavior

	Number	Percent		Number	Percent
1. Type of Debt			5. Behavior that creates debt		
Formal debt	239	70.9	Use more money than have it.	225	66.8
Informal debt	98	29.1	Life is too luxurious.	38	11.3
2. Causes of household debt			Can't take note of	38	11.3

	Number	Percent		Number	Percent
			spending.		
Liabilities for housing	15	4.5	Indebtedness	17	5.0
Liabilities to buy a vehicle	28	8.3	Never saving money	19	5.6
Debt to spend on household consumption	89	26.4	6.Current savings of households		
Education Debt	75	22.3	Have	110	32.6
Investing in business	47	13.9	Have no	227	67.4
Liabilities for Agriculture/Fisheries	83	24.6	7. Have you done income and expenditure account?		
3. Capacity for payment debt			No	205	62.9
Sure	136	40.4	Yes	121	37.1
Pay by installments.	73	21.7	8. Do you have part-time jobs?		
Not sure	128	38.0	No	236	72.4
4. Purpose of saving			Yes	90	27.6
To pay education of the child	51	15.1	9. Do you know about Sufficiency Economy Theory?		
To pay debts	141	41.8	No	9	2.7
To buy real estate	4	1.2	Yes	328	97.3
To save for future use	31	9.2			

Table 2 (Cont.)

10. Purpose of the loan			12. Source of funds		
Real Estate (Buy house, land, car, etc.)	25	8.0	Commercial Bank	20	5.9
Education	86	27.2	Bank for Agriculture and Agricultural Cooperatives	198	58.8
Household consumption	72	22.8	Government Housing Bank	23	6.8
Agriculture / Fisheries	94	29.7	Savings and Credit Cooperatives	12	3.6
Doing business other than farming/non-fishing	39	12.3	Housing Fund	54	16.0
11. Cause of the informal debt			Other people	30	8.9
Debt arising from a business, such as the economic crisis, natural disaster, and lack of liquidity	246	73.0	13. Do you agree that good financial discipline be protect against of debt?		
Debt from unexpected events such as accident, illness	19	5.6	Sure	187	55.5
Debt from non-financial discipline, not plan to save money	47	13.9	Not sure	150	44.5
Debt from delusions such as gambling.	14	4.2			
Can’t access financing from formal debt	11	3.3			

Table 3
Mean and standard deviation value of debt information and cause of household debt problem

Factor	Mean	SD	Level	Factor	Mean	SD	Level
1.The higher level of household consumption. (F_1)	4.08	0.551	Important	11.Member in household had an accident/natural disaster. (F_{11})	2.88	0.927	Moderate
2.The demand for money to invest in household. (F_2)	3.77	0.623	Important	12.The issuing loan competition of financial institutions. (F_{12})	3.17	0.861	Moderate
3. Unstable income and insufficient for household consumption. (F_3)	3.70	0.614	Important	13.Prolonged economic slowdown problem. (F_{13})	3.36	0.698	Moderate
4. The increasing of debt repayment. (F_4)	3.64	0.685	Important	14. The government policy to support easier financial service accessibility. (F_{14})	3.55	0.697	Important
5. The changing of consumption behavior. (F_5)	3.69	0.704	Important	15. Social values such as taste, toxic shame, show off, and materialism. (F_{15})	3.44	0.718	Important
6.Lack of financial plan and careless spending. (F_6)	3.49	0.764	Important	16.Gambling problem/ gambling addiction. (F_{16})	3.66	0.817	Important
7.Ignore to saving. (F_7)	3.26	0.795	Moderate	17. Lack of financial discipline and had wrong attitude toward spending. (F_{17})	3.58	0.752	Important
8.Lack of community strength such as savings and credit cooperatives. (F_8)	3.22	0.648	Moderate	18.Lack of basic financial knowledge and risk management for the debt. (F_{18})	3.56	0.837	Important
9.Lack of recruitment and career creating in community.(F_9)	3.36	0.728	Moderate	19.Response only personal needs such as shopping or traveling. (F_{19})	3.44	1.016	Important
10. Informal debt easier access than formal debt. (F_{10})	3.75	0.889	Important	20. The debt cause of other person loan guarantee. (F_{20})	3.08	1.069	Moderate
				Total	3.48	0.379	Important

4. According to the variables of financial discipline establishment information to solve household debt problem, the result found that all 15 variables had overall mean in high level (Mean=3.51). The top 5 factors consisted with household recognized the significant of saving and normally had saving behavior (Mean=3.78), household recognized the significant of saving in case of future need (Mean=3.73), household had investment to increase the income (Mean=3.63), household applied sufficiency economic philosophy to spending behavior (Mean=3.61), and household had insurance to prevent unexpected situation (Mean=3.57) respectively, as shown in Table 4.

Table 4
Mean and standard deviation value of the financial discipline establishment information to solve household debt problem

Factor	Mean	SD	Level
1.Your household recognized the significant of saving and normally had saving behavior.	3.78	0.855	Important
2.Your household had financial plan by recording household account.	3.30	0.863	Moderate
3.Your household determined and separated any expense.	3.45	0.755	Important
4.Your household determines spending purpose and necessary spending.	3.56	0.701	Important
5.Your household allocated income and expense to prevent overspending.	3.42	0.832	Important
6.You household normally be patient to buy unnecessary product or service.	3.43	0.832	Important

7.Your household recognized the significant of saving in case of future need.	3.73	0.813	Important
8.Your household changed some behaviors that may cause of debt.	3.41	0.816	Important
9.Your household had knowledge and positive attitude toward financial management.	3.42	0.724	Important
10.Your household very well managed household member's finance.	3.45	0.782	Important
11.Your household had insurance to prevent unexpected situation.	3.57	1.024	Important
12.Your household sawing through social values and the technological progress.	3.35	0.788	Moderate
13.Your household had investment to increase the income.	3.63	0.836	Important
14.Your household recognized the significant to applied non performing debt.	3.54	0.775	Important
15.You household applied sufficiency economic philosophy to spending behavior.	3.61	0.712	Important
Total	3.51	0.473	Important

Table 5
Mean and standard deviation value of the solution to solve household debt problem.

Factor	Mean	SD	Level
1. To provide knowledge, financial management skill, debt management, and saving to household to create financial immunities.	4.22	0.617	Very Important
2. To support the appropriate value of spending based on financial discipline to the household in community.	3.67	0.674	Important
3. To campaign the household to change spending behavior and recognize the level of household consumption maintaining.	3.75	0.537	Important
4. To establish household account to managing appropriate income and expense.	3.87	0.732	Important
5. To support income distribution and career creating to the community to increase household income, reduce problem of unemployment, and to solve the poverty that could effect to household debt.	4.07	0.649	Important
6. To support Government Welfare Registration Programme that could access to poverty population.	3.93	0.774	Important
7. To motivate financial institutions or financial service providers recognize the significant of financial service providing responsibility.	3.76	0.672	Important
8. The combination of the funds both public sector and private sector.	3.61	0.725	Important
9. The supporting from private sector to increase the recruitment in the community.	3.93	0.819	Important
10. To expand the opportunity to access low cost financial service to invest in new business.	3.70	0.691	Important
11. To establish basic structure to solve household debt problem from public sector.	3.55	0.706	Important
12. To campaign the household to recognize sufficiency economic philosophy and applied to the livelihood.	3.98	0.668	Important
13. To control the unfair loan issuing from informal financial institution (loan shark).	4.07	0.737	Important
14. The supporting from public sector to access appropriate fund to prevent informal debt problem.	3.76	0.751	Important
15. The participation of people in community, community leader, and local authorities to solve household problem and establish the community strength.	4.01	0.754	Important
Total	3.63	0.364	Important

5. According to the variables of solution to solve household debt problem, the result found that all 15 variables had overall mean in high level (Mean=3.63). The top 5 factors consisted with provide knowledge, financial management skill, debt management, and saving to household to create financial immunities (Mean=4.22), to control the unfair loan issuing from informal financial institution (loan shark) (Mean=4.07), to support income distribution and career creating to the community to increase (Mean=4.07), the participation of people in community, community leader, and local authorities to solve household problem and establish the community strength (Mean=4.01), and campaign the household to recognize sufficiency economic philosophy and applied to the livelihood (Mean=3.98) respectively, as shown in Table 5.

6. The data analyzed the household financial stability of the samples and found that debt to income ratio per month represented 39.2 percent household had liquidity while 60.8 percent had no liquidity in

household. Debt service ratio represented that 61.4 percent of the samples had no ability of repay and 38.6 percent had ability of repay respectively as shown in Table 6.

7. The data analyzed the household financial freedom of the samples and found that most of the sample (52.2%) could survive by themselves. However, only 4.2% of them had the financial freedom respectively as shown in Table 7.

Table 6
The number and percentage of measurement data of financial stability with 2 ratios

Data of financial freedom	Number	Percent	Data of financial freedom	Number	Percent
1. Debt to Income Ratio (DTI) (X_{11})			2. Debt to Service Ratio (DSR) (X_{12})		
$\leq$ 36% (Pass)	132	39.2	$\leq$ 0.4 (Pass)	130	38.6
> 36% (Fail)	205	60.8	> 0.4 (Fail)	207	61.4

Table 7
The number and percentage of measurement data of financial freedom with 2 ratios

Data of financial freedom	Number	Percent	Data of financial freedom	Number	Percent
1. Survival Ratio (Y_1)			2. Wealth Ratio		
$\geq$ 1 (Pass)	176	52.2	$\geq$ 1 (Pass)	14	4.2
< 1 (Fail)	161	47.8	< 1 (Fail)	323	95.8

8. Hypothesis: Household factor affected to household survival ratio. Independent variables were household factors totaling to 12 variables (X_1-X_{12}) which not multicollinearity (Black, 2006: 585). Each variable was quantitative variables. The factors were used to find correlation with dependent variables, that is, Survival ratio (Y_1), and the hypothesis was tested through Multiple Linear Regression Analysis using Stepwise method as shown in Table 8.

An equation was displayed as below.

$$Y_1 = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \beta_{10}X_{10} + \beta_{11}X_{11} + \beta_{12}X_{12} + e$$

Table 8
Regression analysis to predict household factor affected to household survival ratio

Predictor data	β	SE	t	p-value
Constant	0.989	0.087	11.378	0.000*
Average monthly expenses (X_6)	-0.00009	0.00000	-20.384	0.000*
Average monthly income from working (X_4)	0.00006	0.00001	10.708	0.000*
DSR (X_{12})	0.093	0.037	2.497	0.013*
Average monthly income from the assets (X_5)	0.00002	0.00001	2.274	0.024*
Member in household (X_2)	-0.032	0.015	-2.058	0.040*
R= 0.774; R^2= 0.600; Adj.R^2 = 0.594; F=99.213; p-value =0.000				

* ($p < 0.05$)

The analysis of household factor affected to household survival ratio of the samples based on the hypothesis testing by using multiple linear regression. The result of data analysis represented that average income from working per month (X_4), ability of repay (Debt to Service Ratio) (X_{12}), and average income from assets (X_5) had positive relationship with the household survival ratio. Average expense per month (X_6) and household size (Member in household)(X_2) had negative relationship with household survival ratio at statistical significance 0.05 and the household survival ration could predicted as 59.4 percent (Adjusted R^2= 0.594) whilst household factor related to household survival ration in very high lever by considered from the relation (R = 0.774). A predictive equation was as follows:

$$Y' = 0.989 - 0.032X_2 + 0.00006X_4 + 0.00002X_5 - 0.00009X_6 + 0.093X_{12}$$

9. The exploratory factor analysis using PCA found that there were 20 variables affecting the cause of household debt problem. The analysis using Varimax rotation revealed that the first co-variable that accounted for 16.553 % of the variance in explaining the variables was 5 variables. The modifying factors defined as variable concerned with personal factor of household member such as attitude toward spending, personal demand for money, and gambling behavior. (F_{16}, F_{17}, F_{18}, F_{19}, F_{20}), the second co-variable that accounted for 13.153% of the variance in explaining the variable was 5 variables. The modifying factors defined as variables concerned inconsistent between household income and expense such as unstable income, the increasing or debt repay, and demand for money purposed to investment. (F_2, F_3, F_4, F_5, F_6), the third co-variable that accounted for 9.419% of the variance in explaining the variable was 3 variables. The modifying factors defined as variables concerned with economic fluctuations in Thailand such as household

consumption level, prolonged economic slowdown, and government policy. (F_1, F_{13}, F_{14}), the fourth co-variable that accounted for 9.288% of the variance in explaining the variable was 2 variable. The modifying factors defined as variables concerned with social value and saving discipline such as ignored to plan for saving and social value. (F_7, F_{15}), the fifth co-variable that accounted for 9.063% of the variance in explaining the variable was 2 variables. The modifying factors defined as variables concerned with external household factors that hard to control such as accident that could happened to member of the household, natural disaster, and the competition of financial institutions.
(F_{11}, F_{12}), and the six co-variable that accounted for 6.946% of the variance in explaining the variable was 2 variables. The modifying factors defined as variables concerned with community problem such as lack of community strength and lack of recruitment and career creating in community (F_8, F_9).
All six common factors' explained variation was 64.422 % as shown in Table 9.

Table 9
The factor loading and the communality of 20 variables with before and after Varimax factor rotation comparison.

Data	Factor Loading before rotation						Factor Loading after rotation by Varimax						Communality
	CF1	CF2	CF3	CF4	CF5	CF6	CF1	CF2	CF3	CF4	CF5	CF6	
F_1	0.514*	-0.253	0.143	0.472	0.223	0.320	0.081	0.518*	0.562*	-0.066	-0.173	0.313	0.723
F_2	0.559*	-0.320	0.297	0.280	0.377	0.026	0.147	0.665*	0.392	-0.264	0.080	0.176	0.725
F_3	0.479	-0.073	0.581*	0.066	0.099	0.135	-0.010	0.740*	0.075	0.124	0.114	0.150	0.604
F_4	0.504*	-0.317	0.528*	-0.093	-0.084	-0.117	0.234	0.762*	-0.100	0.015	0.025	-0.123	0.662
F_5	0.590*	-0.240	0.266	-0.143	-0.203	-0.164	0.459	0.564*	-0.065	0.110	0.026	-0.140	0.565
F_6	0.562*	0.023	0.349	-0.124	-0.380	-0.072	0.344	0.522*	-0.087	0.426	0.062	-0.139	0.603
F_7	0.243	0.546*	0.126	0.082	-0.331	0.307	-0.051	0.041	0.104	0.730*	0.082	0.173	0.584
F_8	0.372	0.414	0.132	-0.269	0.103	0.498	0.057	0.164	-0.103	0.427	0.219	0.622*	0.658
F_9	0.348	0.175	-0.282	-0.289	0.315	0.490	0.273	-0.082	-0.008	0.064	0.113	0.745*	0.653
F_{10}	0.408	-0.389	-0.329	-0.047	0.117	0.249	0.484	0.098	0.153	-0.213	-0.265	0.348	0.504
F_{11}	0.350	0.515*	0.259	-0.270	0.310	-0.279	0.082	0.189	-0.087	0.154	0.787*	0.097	0.702
F_{12}	0.274	0.570*	0.043	0.026	0.498	-0.335	0.002	-0.013	0.247	0.010	0.832*	0.100	0.764
F_{13}	0.434	0.295	-0.223	0.560*	0.144	-0.175	0.174	-0.021	0.747*	0.131	0.287	-0.028	0.690
F_{14}	0.412	0.204	-0.215	0.627*	-0.238	-0.051	0.202	-0.002	0.718*	0.361	-0.038	-0.148	0.709
F_{15}	0.267	0.483	0.068	0.140	-0.402	0.172	0.035	0.023	0.161	0.699*	0.058	0.024	0.520
F_{16}	0.645*	-0.352	-0.272	0.032	-0.037	-0.006	0.673*	0.236	0.261	-0.089	-0.149	0.101	0.616
F_{17}	0.603*	-0.287	-0.272	-0.063	-0.061	-0.083	0.680*	0.181	0.166	-0.066	-0.070	0.049	0.535
F_{18}	0.706*	-0.113	-0.375	-0.285	-0.067	-0.101	0.842*	0.077	0.041	0.045	0.097	0.142	0.748
F_{19}	0.719*	0.060	-0.199	-0.358	-0.066	-0.156	0.756*	0.155	-0.047	0.165	0.278	0.116	0.717
F_{20}	0.619*	0.326	-0.278	-0.007	-0.096	-0.163	0.555*	-0.028	0.273	0.330	0.329	0.044	0.602
(Eigenvalues)							**3.311**	**2.631**	**1.884**	**1.858**	**1.813**	**1.389**	**12.885**
(% of Variance)							**16.553**	**13.153**	**9.419**	**9.288**	**9.063**	**6.946**	**64.442**

Note: Kaiser-Meyer-Olkin =0.749; p-value = 0.000

Conclusion and Recommendations

1. The samples recognized and had positive attitude towards financial discipline creating such as recognized the significant of saving and usually saving money, recognized the significant of saving money in case of emergency, agreed with investment to increase the income, applied sufficiency economic philosophy to spending behavior, and bought insurance for the emergency situation that may occur respectively. According to Thanaiwong Kirativanich (2006), who explained that creating savings discipline is the most important and have to realize that saving money is not something that is done when there is money left over so it is necessary to practice saving money for habits. The previous conclusion according to

Vichaya Yuthaphuthanon (2017), who described that creating financial discipline is essential to managing your life as a system such as reduce unnecessary spending, payment is due, and saving money for investing so it is important to set clearly goals that will lead to financial stability and financial freedom without debt.

2 . Most of problem and causes of household debt caused of the higher level of consumption, demand for money to investment, informal debt easier access than formal debt, unstable income and insufficient to expense, and changing of consumption behavior. According to Natrapee Fongprapai (2014), who studied effects of economic factors on household debt in Thailand and found that the gross domestic product (GDP), the consumer price index, the loan rate, the number of population, and the wage index were found to be directly correlated with household debt.

3. The government sector should control improper issuing loan of the informal financial institution and concerned institution required to response and rescue the informal debt.

4. The concerned institutions required to support and provide the knowledge of personal financial management, supported household to recognize the significant of saving, suggested people in the community to acknowledged and had positive attitude towards financial management and avoid increasing their debt.

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THE STUDY OF SOCIAL WELFARE NEEDS OF ELDERLY IN PHAWONG SUB DISTRICT, MUANG DISTRICT, SONGKHLA PROVINC

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ABSTRACT

In present day, the quantity of elderly is rapidly increasing affected to public and private sector should collaborate to escort and support condition, role, and activities of the elderly to prepare Thailand for Age Society. Nevertheless, elderly encountered with social welfare accessibility problem and still required social welfarecontinuously. The study of social welfare needs of elderly in Phawong sub-district, Muang District, Songkhla Province purposed to examined elderly social welfare needs and introduced the method of social welfare preparation for elderly.This survey research applied questionnaire to collected the data from 206 elderly in Phawong sub-district, Muang district, Songkhla province since January to March 2018 and analyzed data by descriptive statistics. The study of elderly needs based on 7 dimensions of the elderly requirement from Ministry of Social Development and Human Security. The result found that the elderly requirements in high level consisted with permanent income needs ($\bar{x}$=4.16), general community service needs ($\bar{x}$=3.90), career, income, and labor welfare needs ($\bar{x}$=3.86), recreation needs ($\bar{x}$=3.54), education needs ($\bar{x}$=3.52), habitat needs ($\bar{x}$=3.42), and sanitation needs ($\bar{x}$=3.04) respectively. Therefore, providing social welfare to the elderly from public sector should support the elderly to have appropriate and sustainable occupation, provide recreation activities and establish elderly network in the community, and provide and support the education to the elderly. These elements represented the method to develop social welfare for the elderly.

Keyword: needs, social welfare, elderly

Introduction

Foundation of Thai Gerontology Research and Development institute or TGRI (2015) reported the elderly situation in Thailand that there were 64.6 million Thai populations in 2013 and 9.6 million populations were elderly. TGRI forecasted that the number of elderly population would be 17.6 million people in 2030 (26.3 percent) and would increase to 20.5 million people in 2040 (32.1 percent). According to this information, it represented that Thailand approaching to aging society. The increasing of elderly caused of the successful family planning and the progressive medical and public health that affected to worldwide populations live longer. According to the World Bank Working for a World Free of Poverty (2016) report, they explained that there were more than 10 percent or over 7 million elderly populations who aged over 65 years in 2015 and predicted that the number of elderly populations would be increase to 17 million people within 2040 that over a quarter of Thailand population.

Public and private sector cooperated to protect, promote, and support elderly status, role, and activities to support the approaching aging society of Thailand. Although Thai populations had National Health Security coverage since 2002, there were some reports presented that there were a lot of elderly encountered with difficult accessibility of health service. The main reason of hard health service accessibility was the elderly must relied on the relatives or caregivers to take them to the hospital or public health nevertheless, this situation often happened in the poverty, elderly who over 80 year, and elderly who lived in rural areas. Furthermore, the changing of social and body effected to elderly wellbeing and they required relying on other people to respond their basic needs.

Therefore, public sector must help and cooperate to provide welfares to the elderly such as stable income and occupation, education, medical and health, social and culture, and social welfare (Foundation of Thai Gerontology Research and Development institute, 2015).

Phawong sub-district, Muang district, Songkhla province covered 40.34 square kilometers separated into seven villages consisted with 8,026 households or 24,426 populations. There were 1,569 elderly people (Department of Provincial Administration, 2012) and most of the elderly in Phawong sub-district received subsistence allowance depends on stepwise method based on the order of Ministry of Interior for subsistence allowance for elderly in 2009. In 2009, there lacked of information and the study of elderly social welfare needs especially the elderly required health and wellness, education, habitations, careers, income and labor welfare, stability income, recreation, and general social services (Ministry of Social Development and Human Security, 2002).

This research is the survey research examined the elderly welfare needs that could advantage for welfare providing to the elderly populations. The research based on 7 dimensions of the elderly requirement from Ministry of Social Development and Human Security as 1) sanitation needs 2) education needs 3) habitation needs 4) career, income, and labor welfare needs 5) permanent income needs 6) recreation needs and 7) general community service needs. The advantage of this research is to suggest the guideline for Phawong sub-district administration organization to establish the method to provide appropriate elderly welfare that could conducted to elderly wellbeing and develop the welfare providing in the future.

The purpose of this study is to examined the elderly social welfare needs and to introduced the method of social welfare providing for elderly populations.

Review of literature

Elderly

The definition of elderly based on the body condition was the changing of the body that started from declining of cells, lost, and finally death (Bergeman, 1997; Arking, 2006; Masoro, 2006). Drolet, Schwarz & Yoon, (2010)described the elderly as the person who age over 65 years and this definition was accepted in Europe and North America. Sriruen Kaewkungwal (1995) reported that the elderly could separate into 4 ranges as 1) the young-old referred to people who aged 60-69 years 2) the middle-aged old referred to people who aged 70-79 years 3) the old-old referred to people who aged 80-90 years and 4) the very old-old referred to people who aged 90-99 years.

World Health Organization (2000) specified that the elderly was the person who aged over 60 years and could separate into 3 groups 1) elderly was people who aged 60-74 years 2) old was people who aged 75-90 years and 3) very old was people who aged over 90 year and identified the approaching to aging society into 3 levels consisted with 1) ageing society referred to social or country which had population aged over 60 years more than 10 percent of whole populations or had populations aged over 65 years more than 7 percent of whole populations 2) aged society referred to social or country which had population aged over 60 years more than 20 percent of whole populations or had populations aged over 65 years more than 14 percent of whole populations and 3) super-aged society referred to social or country which had population aged over 65 years more than 20 percent of whole populations.

Thailand specified the definition of elderly based on The Act on the Elderly, B.E. 2546 (2003 A.D.) as Thai people who aged over 60 years and could receive some welfares from public sector such as 60 years was the retirement age for government officers or start to receive subsistence allowance. In Thailand, there was some suggestion to increase the retirement age from 60 years to 65 years. Varachai Thongthai (2006) explained that most of Thai people aged 60-64 years had healthy wellness and at least 2 out of 3 people in this group were productive labor. In 2010, Pramote and Patama describes that the rule to specified the definition of elderly should base on the leftover age that would according to Thai people live longer in present day and the study claimed that people who aged over 65 years could live longer 17 years that equal the leftover ages of people aged 60 years in the past. People who became elderly might encountered with limitation activities including daily routine, anxiety, loneliness, unemployment, society, financial, and social acceptance. The elderly wellbeing could create quality of life for elderly and should develop the system that support basic needs for elderly and established active aging to reduce reliance other people and the elderly could became self-reliance, self-care, and could do appropriate activities by themselves (Sasipat Yodpet, 1999). Therefore, public sector should establish the system to support the elderly to had self-reliance and support appropriate activities for elderly including physical, psychological, and sociological activity based on the potential of the elderly (Bureau of Health Promotion, Department of Health, Ministry of Public Health, 2013).

Social welfare for elderly

Encyclopedia of social work (Pumphrey, R. 1971, p1446) explained the definition of "welfare" as the activities established by public sector and volunteers purposed to prevent and eliminate social problems or to improve the being of people, group, and community. Social Welfare Promotion Act, B.E 2546 (2003) specified that "welfare" referred to systematic social service concerned with protection, solving, developing, and supporting the social security to responded basic needs of the population. The welfare establishment purposed to create population wellbeing and increase population self-reliance based on social standard including education, habitation, health and wellness, occupation and income, recreation, justice, and general social service.

Friedlander and Apte (1980) described social welfare as regularity, policy, and service to facilitate service providing accorded to social needs. Social welfare was accepted as basic significant service to create rapid and permanent changing that conveyed to the better condition. Matin and Penna (1998) explained that social welfare must attend to the well-being in various dimension including health, security, object integrity, participation, and other factors. Theera Srithammarak (1995) clarified social welfare as systematic social service and institution purposed to assisted person or people to satisfied the standard of living and wellness. The relation between people and social increased the opportunity for self-development based on their abilities including established wellbeing accorded household needs and community. Social welfare could concluded that the systematic of social service established to prevent and solve social problems and social development including support social security. The purpose of social welfare was to support the population to had standard wellbeing with responded people basic needs that required quality of life development which fair and thorough. The social welfare should covered basic social service needs included education, sanitation, habitation, occupation, income, labor welfare, social security, recreation, and general social services (Ministry of Social Development and Human Security, Phetchaburi Province, 2016).

Elderly social welfare providing

Department of Older Persons (DOP) (2018) found that elderly social welfare providing encountered with the lack of labor that could effected to country competitiveness in the future and affected to the elderly and child population increasing reliance on working-age population. The basic requirement of elderly to facilitated the appropriate being consisted with wellness and health care service, health insurance, life insurance, and saving for wellbeing on aging process.

The elderly meanwhile tended to encountered with chronic disease, disability, disease caused of the organ system declining and dementia syndrome that tend to increase in the future and these health problems affected to the increasing of health care budget providing. Mattaya Sripana (2014) explained that the elderly needed and required to obtain social welfare from public sector or others such as provide education or useful information for elderly being, supply complete sanitation, arrange sufficient habitation, provide appropriate occupation and income, offer recreation activities including home visits by medical staffs and others methods to facilitate the elderly to go to the hospital in case of necessity (Siriwan Arunthippaitoon, 2016). Rapeepan Kumhom (2006) described the widely elements of social welfare that separated into 7 dimensions as education, health, housing, employment and income maintenance, social security, social services, and recreation and the narrow elements of social welfare according to Social Security Act of America could divided into 3 services as social insurance, public assistance, and social services. Nevertheless, the widely social welfare elements and narrow social welfare elements depends on applying of the social welfare officers and Thailand applied both wide and narrow elements.

Research Methodology

This study was survey research purposed to examined social welfare needs of the elderly consisted 7 dimensions as education, health, housing, employment and income maintenance, social security, social services, and recreation.

Population and Sample

The population of this study consisted 1,569 elderly both male and female aged over 60 years who lived in Phawong sub-district, Muang district, Songkhla province.

The sample was 206 elderly in Phawong sub-district, Muang district, Songkhla province calculated by using Yamane's formula (1970) accorded to Boonchom Srisa-ard (1992). The data collected by convenience sampling in Phawong sub-district, Muang district, Songkhla province since January to March 2018.

Research Tool

This research applied structured questionnaire using multiple choices and the question concerned with elderly social welfare needs based on principle of Ministry of Social Development and Human Security consisted 7 dimensions of social welfare providing. The questionnaire consisted with 4 parts 1) general information of the respondents including gender, age, marital status, health, the number of family members, education level, occupation, income and expense, and source of income 2) the current social welfare that the respondents receiving 3) social welfare needs question based on Likert scale using 5 levels as 5 = strongly agree, 4 = agree, 3 = moderately agree, 2 = disagree, and 1 = strongly disagree and 4) problems and suggestion for social welfare providing to the elderly using open ended questions. The confidence of the whole questionnaire is obtained by Alpha coefficient which is found be 0.952.

Data Analysis

This study was quantitative research using SPSS 17.0 to calculated frequency, percentage, and mean.

Results of Research

Part 1 Profile of Elderly

The general information of 206 respondents in Phawong sub-district, Muang district, Songkhla province consisted with gender, age, marital status, education level, occupations, and average income as shown in Table 1.

Table 1

Profile of elderly.

	Number	Percentage
Gender		
Male	71	34.5
Female	135	65.5
Age		
The young-old (60-69 years)	116	56.3
The middle-aged old (70-79 years)	73	35.4
The old-old (80-89 years)	14	6.8
The very old-old (90-99 years)	3	1.5
Marital Status		
Single	9	4.4
Married	113	54.8
Widowed/divorced/separated	84	40.8
Education Level		
Primary School	187	90.8
High School/Vocational Certificate	19	9.2
Occupations		
Officer/employee	12	5.8
Merchant/self-employed	44	21.4
Agriculturist	76	36.9
Pensioner	6	2.9
Unemployed	68	33.0
Income per Month		
500 Baht – 1,000 Baht	51	24.8
1,001 Baht – 5,000 Baht	99	48.1
5,001 Baht – 1,000 Baht	52	25.2
10,001 Baht – 15,000 Baht	4	1.9

According to Table1, the result represented that 65.5 percent of the respondents were female and 35.5 percent were male, 56.3 percent aged young-old (60-69 years and 35.4 percent aged middle-aged ole (70-79 years), 54.8 percent were married and 40.8 percent were widowed/divorced/separated. The education level of most respondents was primary school (90.8 percent) and worked as agriculturists (36.9 percent) and merchant/self-employed (21.4 percent). The average income per month of the elderly were 1,001 - 5,000 Baht (48.1 percent), 5,001 – 10,000 Baht (25.2 percent), and 500 – 1,000 Baht (24.8 percent) respectively.

Part 2 the seven dimensions of elderly needs.

2.1 Health

The sample included 206 elderlies and the result found that the elderly needed health service in moderate level that included 7 lists had mean between 3.98-2.85 and overall mean was 3.04. When considered each list, the data represented that the elderly required complimentary medical service (mean 3.98) and nutrition support activity (mean 3.83) in high level. Furthermore, the elderly required the public sector to provide medical consulting service in moderate level (mean 3.40) as shown in Table 2.

Table 2

Mean and SD Values of Health Service Requirement

Factors	Mean	SD	Level
Public health officer should provide home visit and health care advice.	2.85	1.138	Moderate
Public sector should provide medical consulting service.	3.40	0.873	Moderate
Public sector should provide Thai Traditional Medicine service.	3.39	0.961	Moderate
The elderly required public sector to provide home medical treatment.	3.37	1.114	Moderate
The elderly required public sector to provide the ambulance to transport the patient.	3.33	0.986	Moderate
Complimentary medical service.	3.98	1.043	High
Nutrition support activity	3.83	0.943	High
Total	3.04	1.008	Moderate

Cronbach's Alpha = 0.865

2.2 Education

According to the result of this study, the elder required education service in high level (mean 3.52) consisted with 5 lists and the most important including the elderly required knowledge exchange activity between elderly group in high level (mean 3.77), required to be accepted as community knowledge and wisdom representative in high level (mean 3.59), and required learning center for elderly in the community in high level (mean 3.50) as shown in Table 3.

Table 3

Mean and SD Values of Education Requirement

Factors	Mean	SD	Level
The elderly required self-care training.	3.40	0.904	Moderate
The elderly required community radio station for elderly.	3.36	1.016	Moderate
The elderly required learning center for elderly in the community.	3.50	0.991	High
The elderly required to be accepted as community knowledge and wisdom representative.	3.59	0.992	High
The elderly required knowledge exchange activity between elderly groups.	3.77	1.033	High
Total	3.52	0.987	High

Cronbach's Alpha = 0.863

The elderly require housing welfare in high level (mean 3.42) included 5 lists and the most important requirements consisted with the elderly require without charge foster home in high level (mean 3.85), required sufficient foster home in high level (mean 3.43), and required home renovation welfare in moderate level (mean 3.30) as shown in Table 4.

Table 4

Mean and SD Values of Housing Requirement

Factors	Mean	SD	Level
The elderly required home renovation welfare.	3.30	1.158	Moderate
The elderly required emergency shelter for homeless elderly.	3.29	0.923	Moderate
The elderly required low interest rate loan to buy a house.	3.24	1.104	Moderate
The elderly required sufficient foster home.	3.43	1.009	High

The elderly required without charge foster home.	3.85	0.895	High
Total	3.42	1.017	High

Cronbach's Alpha = 0.869

The elderly required employment and income maintenance in high level (mean 3.86) included 5 lists. The important needs for employment and income maintenance consisted with the government should increase elderly subsistence allowance represented in highest level (mean 4.58), the elderly required the production place and selling place in high level (mean 3.78), and required some organizations to provide appropriate occupation in high level (mean 3.64) as shown in Table 5.

Table 5
Mean and SD Values of Employment and Income Maintenance.

Factor	**Mean**	**SD**	**Level**
The elderly required job training to establish the income.	3.55	1.070	High
The elderly required some organization to provide appropriate occupation.	3.64	0.967	High
The elderly required the production place and selling place.	3.78	1.107	High
The elderly required some organizations to cooperate with elderly who need job.	3.74	1.007	High
The government should increase elderly subsistence allowance.	4.58	0.766	Highest
Total	3.86	0.983	High

Cronbach's Alpha = 0.799

The data analyzed that the elderly required social security including occupation, income and labor welfare in high level (mean 4.16) consisted with 3 lists 1) the elderly required constant elderly subsistence allowance in highest level (mean 4.33) 2) the elderly required the increasing of tax deduction to their children who raising and taking care the elderly in high level (4.10) and 3) the elderly required the community to establish the fund for assist the elderly in high level (mean 4.10) as shown in Table 6.

Table 6
Mean and SD Values of Constant Income

Factor	**Mean**	**SD**	**Level**
The elderly required constant elderly subsistence allowance.	4.33	0.878	Highest
The elderly required the increasing of tax deduction to their children who raising and taking care the elderly.	4.10	0.902	High
The elderly required the community to establish the fund for assist the elderly.	4.05	1.001	High
Total	4.16	0.927	High

Cronbach's Alpha = 0.756

The data analysis concluded the elderly needs for recreation in high level (mean 3.54) consisted with 5 lists and the most important included 1) public and private sectors should provide appropriate supportive exercise activity in high level (mean 3.94) 2) the public and private sectors should provide safety public relaxation area for elderly in high level (mean 3.74) and 3) public and private sectors should offer the discount for transportation fare in festival holidays or special occasions for elderly in high level (mean 3.69) as shown in Table 7.

Table 7
Mean and SD Values of Recreation Requirement

Factor	**Mean**	**SD**	**Level**
The public and private sectors should provide appropriate supportive exercise activity.	3.94	1.022	High
The concerned organizations should established elderly club or elderly network.	2.95	0.951	Moderate

The elderly required stadium for elderly.	3.40	0.957	Moderate
The public and private sectors should offer the discount for transportation fare in festival holidays or special occasions for elderly.	3.69	0.932	High
The public and private sectors should provide safety public relaxation area for elderly.	3.74	0.992	High
Total	3.54	0.971	High

Cronbach's Alpha = 0.882

The data analysis represented that the elderly needed social service in high level (mean 3.90) consisted with 5 lists and the most important included 1) the government should increase elderly subsistence allowance for the elderly who cannot work in highest level (mean 4.06) 2) the elderly required some departments to provide the consulting for the elderly who encountered with legal problem in high level (mean 3.95) and 3) the elderly required the community to participated in elderly taking care in high level (mean 3.90) as shown in Table 8.

Table 8
Mean and SD Values of Social Service Requirement.

Factor	**Mean**	**SD**	**Level**
The government should increase elderly subsistence allowance for the elderly who cannot work.	4.06	1.337	High
The government should provide the funeral expense allowance for needy elderly.	3.70	0.980	High
The elderly required the community to participate in elderly taking care.	3.90	0.932	High
The elderly required the volunteer for home visiting and taking care the elderly.	3.87	0.934	High
The elderly required some departments to provide the consulting for the elderly who encountered with legal problem.	3.95	0.922	High
Total	3.90	1.021	High

Cronbach's Alpha = 0.952

Conclusion

According to the study of elderly social welfare needs in Phawong sub-district, Muang district, Songkhla province, the result represented that there are 6 dimensions of elderly need in high level consisted with 1) constant income needs 2) social service needs 3) employment, income, and labor welfare needs 4) recreation needs 5) education needs and 6) housing needs respectively. The only 1 dimension in moderate level needs was health needs.

The elderly required the constant income and employment due to economic problem and the operating of social welfare must operate via public sector and the government officer cannot provide sufficient service that could cover basic needs of income. The result of this study accorded to KanyanatFaikam (2014) who studied the management of the elder welfare in Thailand and found that the economic needs of elderly were occupation and income need due to if the elderly could not gain the income, they would encountered with lack of spiritual security and anxiety.

The elderly required the public sector to provide social service and recreation including offer opportunity for the elderly to participate in various activities, provide supportive exercise activity, and provide safety public relaxation area to motivate the elderly to recognize their self-worth and create their self-esteem, establish positive thinking toward themselves, establish self-respect, and cultivate the elderly to recognize that they had equal value with others. According to SomrakRaksasap et.al. (2015), who described that the self-worth recognition of elderly was people's imagination assessment towards themselves affected thoughts, desire, value, emotion, and personal goal setting that could influenced to behavior. People who recognized their self-worth could had lively personality and tended to live as reasonable person and accepted the different between people whilst people who had low self-worth tended to be depressive. Therefore the recognition of self-worth was the positive characteristic of people who had good mental health.

The elderly required knowledge from learning and technical training such as cooking and crafting that could establish the satisfaction and support the elderly wellbeing by providing supportive occupation welfare purposed to motivate the elderly to be socialize. The result of this study accorded to KiriyaTansavatdi and BooncherdNuim (2014) and ApisadaLaowattanabhongse (2011) who explained that the elderly required to participate in training activity that could apply the knowledge to their occupations and required to participate the socialize activity.

Recommendations

According to the result of this research, the recommendations could concluded as the public sector should determine the policy based on the elderly basic needs and develop the elderly welfare attending to sustainability to motivate and support the self-reliance of the elderly. Providing and supporting the occupation to the elderly should operate in systemize and clearly to prevent the duplicate working of concerned organizations. The public sector should clearly allocate the expenditure to effective support the elderly wellbeing and should support the elderly to participate in appropriate activities to motivate the elderly to training and obtain the skill including provide knowledge of social service institution and club for elderly.

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THE STUDY OF PURCHASING BEHAVIOR OF OTOP PRODUCT VIA SOCIAL NETWORK

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Abstract

The study of purchasing behavior of OTOP product on social network is applied research purposed to identify purchasing behavior and examine the problem when purchasing OTOP product on social network in Thailand. This research provided the suggestion to applied social network to create the chances for business, the method to expand distribution channel, and the way to communicate with the customer. The data collected from 400 social network users in Thailand by using convenience sampling and structured questionnaire. The questionnaire consisted with 3 parts; (1) the general information of the respondents, (2) purchasing behavior, and (3) problem when buying OTOP product on social network. The result found that most of the respondents are female age between 26-35 years, graduated bachelor's degree, work as staffs/employees, and have income 10,001-15,000 Baht. The social network users usually buy cloth and costume product (37.0%) when the seller present the new and interesting product (40.0%). The reasons to buy OTOP product on social network are the price is cheapest than other channels (22.3%) and convenience to purchase (21.5%) by purchase direct to the manufacturer or producer's social network (Facebook) (36.3%). The buyers often spend 500-1,000 Baht per one order (51.5%) and using bank transfer payment (46.8%). The problems when buying OTOP product on social network are the product does not match the description and found some defect from transportation. Therefore, the OTOP seller should emphasized to continued develop the new product and improve product presentation on social network according to the buyer needs to increase the chances to sell the product in the future.

Keywords: purchasing behavior, OTOP, social networks

Introduction

In current days, there are some changes of the environment such as social factors, culture, traditional, environment included the innovative technology. These changes affected to the people lifestyle and established and continuous improve some knowledge managements especially Information technology (IT). IT was described as the method to applied computer and telecommunication equipment for collecting, searching, and processing the information with other businesses or organizations included other technology to expand the information.

According to the survey in 2013, the result found that there are 26,140,473 Thailand internet users or calculated as 28.9 percent of Thailand populations (National Electronics and Computer Technology Center, 2013). Electronic Transactions Development Agency described the average of internet using per week was increasing from 32.3 hours per week or 4.6 hours per day in 2013 to 50.4 hours per week or 7.2 hours per day. The changing of inter using behavior affected to the increasing of electronic business and electronic media called e-commerce. E-commerce defined as the transactions via electronic media such as internet, computer network, and mobile phone. E-commerce included electronic transfer, supply chain management, online advertising, and online trading. The purpose of e-commerce included to decrease the expense and increase organization efficiency by reduce the significant of the role of business elements such as locations, building, warehouse, exhibition room, salesperson, product advisor, receptionists, and the most important is to decrease the distance and time for transactions because the users can use worldwide e-commerce in unlimited time. In Thailand, the most of e-commerce entrepreneurs are B2C (75.2 percent), B2B (23.4 percent), and B2G except government procurement via e-Auction (1.4 percent) (National Statistical Office, 2012). According to the mentioned statistic, Internet is the widespread channel for the entrepreneurs to provide products and services to the customers. There are a lot of internet trading channels such as establishing the website, create blog, provide e-catalog, or using social network.

Social network is the channel combined with a lot of users in current days and the statistic from Electronic Transactions Development Agency represented the top three social networks and applications are Facebook (93.7 percent), LINE (86.8 percent), and Google+ (34.6 percent). Furthermore, Instagram and Twitter users are increasing compared with the statistic in 2013. The statistic represented that there are 12 percent of Instagram users in 2013 but in this year, there are 34.1 percent users. For the statistic of Twitter users, there are 8.2 percent users in 2013 and increasing to be 16.1 percent in this year. Therefore, these statistics represented the opportunities of business to using social network to increase distribution channel and communicate with the customers.

Songkhla Province provided OTOP products divides by 5 kinds as food, beverage, clothes and costume product, decorations and souvenirs, and herbal products (non food). Thai government authorized Community Development Department to supported OTOP project by developing the potential of the entrepreneurs and manufacturers. OTOP developing based on knowledge, technology, and local wisdom could convey to the standardize product, high quality, outstanding, and could increase the value of OTOP product that would acceptable both Thailand and International (Songkhla Community Development Office, 2013).

However, the community enterprise should perceived purchasing behavior on social network and determined the methods to using social network to support OTOP entrepreneurs to increase the business opportunities, expand distribution channels, and communicate with customer effectiveness and achieve the goal of online business. This study purposed to examine purchasing behavior of OTOP product on social network and study the problem of OTOP product purchasing on social network including introduce the method for using social network to increase business opportunity, expand the distribution channel, and communicate with the customers for community enterprise entrepreneurs.

Literature Review

OTOP

In 2010, the Community Development Department described OTOP as the concept that emphasized to established procedure for generated income from local product. The concept encouraged the community to create product by using creativity and product development, manufacturing, management, and apply technology with the operation to achieve acceptance quality in international level. Furthermore, OTOP represented the local culture in each community and cultivated the worthiness to the next generation. OTOP products divided into 5 kinds as food, beverage, clothes and costume product, decorations and souvenirs, and herbal products (nonfood).

Consumer behavior and decision

Foxall & Sigurdsson (2013) mentioned that consumer behavior means naturally actions affected to the marketing. Wandee Rattanakaikaew (2011) explained consumer behavior and decision as the group of people or household who purchase or require product or service for personal use or decision making behavior and action concerned with purchasing and use the service to response their needs and satisfaction.

The study of consumer behavior referred to studying the decision making behavior of buying products and services to maximize the satisfaction on Budget constraint. Consumer behavior could describe as the actions or expressions caused of inside stimulus such as consideration, attitude, and values and each expression could influenced by external factors such as culture and social (Nunta Srijaras, 2008).

Furthermore, Kamolthip Thippala (2012) claimed that consumer behavior is the gestures of purchasing, evaluating, and seeking the information of products or services depends on their needs or expectations. Kotler (2009) explained the meaning of consumer behaviors as the response of stimulation in the environment and evaluating via consumer's conscience. Consumer characteristic and decision making process convey to decision making to purchase products or services. The marketer's role is to understand the happening in consumer sentiment when the outside stimulation could affect to consumer decision making. According to Chattayaporn Samerjai (2007) described that consumer behavior started from stimulation from stimulus that influenced to the consumer needs and conveyed to seeking the information of products or services that could respond their needs then making decision to purchase and finally create purchasing behavior that response their needs.

Sukhum Angkoonpipat et al. (2008) claimed that consumer behavior started from stimulus that could established needs and conducted to response the stimulus. The stimulus could be inside stimulus and outside stimulus and could explained as 1) stimulus could happen from inside stimulus and outside stimulus and these stimulus could create consumer needs and could claimed as psychological purchasing motivation 2) buyer's black box or buyer's sensation could influenced by buyer's characteristic and decision making process 3) evaluation of alternative could happened when the buyer understand and evaluate the alternatives

(Thawanwarat Inthanunchai, 2009) or using evaluation of alternative to evaluate the product in alternative group based on the comparison criteria of the consumers 4) purchase decision is a result of evaluation of alternatives and could assist the consumer to determine the satisfaction to the alternative by select the product that they require the most and 5) post purchase behavior referred to process after purchased and experienced the product and the consumer would realize that are they satisfy or not.

Kannika Nguanchoo (2011) studied factors influenced to purchasing behavior on internet and found that most of people buying product via internet because they perceived it was easy for using and intends to purchase goods from internet in high level. Furthermore, the result represented that the attitude towards using internet for purchasing goods, the belief about buying goods on internet, and the belief concerned reference group were average level. Auaree Intarapintuwat (2010) found that the consumer perceived the risk of buying goods online but they prefer the convenience and save time for commute. The study accorded to Ampol Navavongsathian (2010) who found the cause of online purchasing as the buyer focused on the easiness and fastness of purchasing. Suthisa Singrang and Wasan Khan-am (2013) concluded that purchasing behavior via electronic media influenced from product quality perception, reasonable price, and provide return defected goods as the standard promotion. The study of Wandee Rattanakaikaew (2011) found that most of the buyer purchased readymade clothing, they spent 1,501-2,000 Baht per time, and tends to repurchase. The study of online buyer's attitude by Atitaya Karnrew et al. (2011) found that the buyer focused in the new style and in trend product, convenience to compare the price, and convenient payment included provide multimedia advertising to attract the customer.

Social Network

Social networks commonly used for operation or established activities by personals or departments to exchange and share the resource and information. In current days, social network means online network system or the communication via internet (Monnapa Kledplee, 2016). Therefore, social network is the connection between people via internet system by using websites to connect people together. These websites purposed to make people get to know each other and provided variety tools to facilitate connection establishing. Social media based on people needs to communicate or interact together. According to the past, digital 1.0 or web era provided website with information without communication but when the technology developed to digital 2.0 era, there was web application that could interact with the users and the users could communicate to each other via the website.

Website that provided social network or social media created online social networking that assisted people to get to know each other, reveal personal information (pictures, videos), and exchange the opinions and attention together (Cheung, Chiu, & Lee, 2011). According to the statistic, the result found that more than 100 million worldwide people using social network for communication such as Facebook, MuSpace, Linkedln, and others. Each user could create their profile and connect to other people's profile for communication (Cheung & Lee, 2011). Social network is very extensive way of communication not only for the university students but include the leader of top rated organization and working people in different ages are normally use social network.

Social network service is one kind of website to establish social network for internet users that represented the attention and activities and connected to other attention and activities. Social network service normally provides chat application, messaging, mailing, video, music, picture uploading, and blog. The feature included computer to collect the data in SQL database as video or picture and may collected as files. The extensive social network service such as Hi5, MySpace, Facebook, Orkut, and Multiply earn the income from advertising and game top up via ticket or card. Pradondet Nilagupta (2008) explained the meaning of social network as connecting people together by using web technology. Moreover, Ittipol Preetiprasong (2009) mentioned that social network is the phenomenon of connecting between people via internet included the connecting between network and social network together.

Research Methodology

The sample of this study consisted 400 social network users in Thailand that selected by convenience sampling based on Taro Yamane (Yaname, 1973 referred to Jakkrit Samranjai, 2001).

The data collection using structured questionnaire separated into 3 parts included 1) general information of the respondents consisted of 6 closed-ended questions 2) OTOP purchasing behavior via social network consisted of 12 closed-ended questions and 3) problem and suggestion from OTOP purchasing via social network based on the buyer's experience that consisted of 3 questions both closed-ended and open-ended questions.

The data analyzed by SPSS 17.0 program based on descriptive statistics according to the survey data and calculated in percentage, mean, and standard deviation.

Result

General information according to data collecting from 400 social network users in Thailand separated into gender, ages, marital status, education level, occupation, and average income per month as shown in Table 1.

Table 1
Personal data of the respondents

Personal Factors	Quantity (N)	Percentage (%)
Gender		
Male	95	23.7
Female	305	76.3
Aged		
under 25 years	84	21.0
26 years – 35 years	140	35.0
36 years – 45 years	127	31.7
46 years above	49	12.3
Marital status		
Single	158	39.5
Married	212	53.0
Widowed/divorced/separated	30	7.5
Education levels		
High school/Vocational Certificate	24	6.0
Diploma/High Vocational Certificate	86	21.5
Bachelor degree	232	58.0
Above Bachelor degree	58	14.5
Occupations		
Students/university students	80	20.0
Employees/officers	198	49.5
Government official/State enterprise employee	44	11.0
Self-employed	78	19.5
Average income per month		
Less than 10,000 Baht	40	10.0
10,001 – 15,000 Baht	150	37.5
15,001 – 20,000 Baht	117	29.3
20,001 – 25,000 Baht	46	11.5
25,001 – 30,000 Baht	36	9.0
More than 30,000 Baht	11	2.8

According to Table 1, the data represented 76.3 percent of social network users in Thailand are female and 23.7 percent are male. The survey found that 35.0 percent of social network users ages 26-35 years, 31.7 percent ages 36-45 years, and 12.3 percent ages 46 year above respectively. Marital status of social network users represented that 53.0 percent are married, 39.5 percent are single, and 7.5 percent are widowed/divorced/separated. Most of social network users or 58.0 percent graduated bachelor degree, 21.5 percent are Diploma/High Vocational Certificate, and 6 percent are High school/Vocational Certificate. Most of the occupation of social network users or 49.5 percent are Employees/officers, 20.0 percent are student/university student, 19.5 percent are self-employed, and 11.0 percent are government official/state enterprise employee. The average income per month of social network users represented that 37.5 percent are 10,001-15,000 Baht, 29.3 percent 15,001-20,000 Baht, and 2.8 percent are more than 30,000 Baht respectively.

OTOP purchasing behavior via social network

OTOP purchasing behavior of social network users consisted of type of OTOP product on social network, buying opportunity of social network user, reason to buy OTOP product via social network, type of social network that used for sale OTOP product, average spend for OTOP purchasing via social network per time, payment method for buying OTOP product via social network, shop information on social network, and satisfaction towards OTOP product which buying via social network that shown in Table 2 and Table

Table 2
type of OTOP product on social network

Type of OTOP product	Quantity (N)	Percentage
Food	54	13.5
Clothes and costume product	148	37.0
Beverage	46	11.5
Decorations and souvenirs	75	18.7
Herbal product (nonfood)	77	19.3

According to Table 2, the data represented that 37 percent of social network users purchases Clothes and costume product, 19.3 percent purchased herbal product (nonfood), 18.7 percent purchased Decorations and souvenirs, and 11.5 percent purchased beverage respectively.

Table 3
opportunity to buy OTOP product via social network

Opportunity to buy OTOP product	Quantity (N)	Percentage (of selection)
When new arrival or interesting product was presented.	326	40.2
When the users need to use those product.	187	23.0
When the seller provide promotion	37	4.6
Special occasion/the users require some gift for birthday, New year etc.	192	23.6
Non-particular occasion	70	8.6
Total	812	100

According to Table 3, the result found that 40.2 percent of social network users purchased OTOP product when new arrival or interesting product was presented, 23.6 percent purchased OTOP product for special occasion, and 4.6 percent purchased OTOP product when the seller provide promotion respectively.

Table 4
reasons to buy OTOP product via social network

Reason to buy OTOP product	Quantity (N)	Percentage (of selection)
Convenient to purchase.	233	21.5
Cannot find OTOP product on general stores.	152	14.0
Provide delivery service.	96	8.7
Cheaper price than other distribution channels.	241	22.3
Reliable.	133	12.3
The buyer could contact direct to the product provider.	154	14.2
The seller provide promotion (such as offer discount, provide giveaway etc.).	76	7.0
Total	1085	100.0

According to table 4, most of the social network users or 22.3 percent purchased OTOP product because the product is cheaper than other distribution channels, 21.5 percent preferred convenient purchase, and 7 percent require promotion such as discount and offer giveaway respectively.

Table 5
type of social network that used for sale OTOP product

Type of Social network	Quantity (N)	Percentage
Website of OTOP entrepreneur/manufacturer.	74	18.5
Website of OTOP seller (middleman)	31	7.7
Facebook of OTOP entrepreneur/manufacturer.	145	36.3
Line application	80	20.0
Instagram	63	15.7
Others	7	1.8

According to table 5, most of social network users or 36.3 percent purchased OTOP product via OTOP entrepreneur/manufacturer Facebook, 20 percent purchased OTOP product via Line application, and 1.8 percent purchased via other social network such as Twitter and Youtube respectively.

Table 4.6
average spending for OTOP purchasing via social network per time

Average spending for OTOP product per time	Quantity (N)	Percentage
Less than 500 Baht	82	20.5
500-1,000 Baht	206	51.5
1,001-2,000 Baht	55	13.7
2,001-3,000 Baht	5	1.3
More than 3,000 Baht	52	13.0

According to Table 6, most of the social network users or 51.5 percent spent 500-1,000 Baht for buying OTOP product per time, 20.5 percent spent less than 500 Baht, and 1.3 percent spent 2,001-3,000 Baht respectively.

Table 7
payment method for buying OTOP product via social network

Payment method	Quantity (N)	Percentage (of selection)
Cash	6	1.0
Cash on delivery	166	26.6
Debit one's account	5	0.8
Credit card	118	18.9
Bank transfer	292	46.8
Postal order/bill of exchange/cheque	37	5.9
Total	624	100.0

According to table 7, most of social network users or 46.8 percent preferred bank transfer, 26.6 percent selected cash on delivery, and 1 percent paid by debit one’s account.

Table 8
searching method for shop information on social network.

Source of information	Quantity (N)	Percentage
Search engine (such as Google)	198	28.2
Portal web (such as Sanook.com, Kapook.com)	142	20.2
Online advertising	34	4.8
Word of mouth	181	25.7
Friend on social network	148	21.1

According to table 8, the data represented that 28.2 percent of social network users received shop information from search engine (such as Google or Yahoo), 25.7 percent received the information from word of mouth, and 21.1 percent received the information from friends on social network.

Table 9
satisfaction towards OTOP product which buying via social network

Satisfaction level	Quantity (N)	Percentage
Highest level	128	32.0
High level	172	43.0
Moderate level	84	21.0
Low level	16	4.0

According to table 9, satisfaction level of 43 percent social network users represented in high level, 32 percent satisfied in highest level, 21 percent satisfied in moderate level, and 4 percent satisfied in low level.

Problem when buying OTOP product via social network

This study described the problem when buying OTOP product via social network as shown in Table 10.

Table 10
Problem when buying OTOP product via social network

List of problems	Quantity (N)	Percentage
Delay in receiving goods	86	21.5
Do not receive goods/lost goods	76	19.0
Product does not match the description	113	28.3
Defective goods from delivery	96	24.0
Complicate purchasing procedure	18	4.5
No after sale service/no warranty	11	2.7

According to table 10, the result represented that 28.3 percent of social network users found the received product does not match the description, 24 percent found defective goods from delivery, 21.5 percent claimed that the goods was delayed, and 2.7 percent mentioned that there was no after sale service/no warranty.

Discussion

The analyzed data of studying purchasing behavior of OTOP product via social network could explained as:

OTOP product purchasing behavior of social network users could described that most of users purchased cloth and costume product that according to Suthisa Singrang and Wasan Khan-am (2013) who found that the first product that the sample selected was costume and second product was cosmetic. The result of this study also according to Wandee Rattanakaikaew (2011) who explained that most of the buyers usually purchase readymade clothing and the reason might be the buyers could easily see the appearance of the product than other product and cloth and costume product could stay last long and have no expiry date.

This study represented that social network users usually buy OTOP product when the seller provide new arrival and interesting product and the cheaper price than other distribution channels and convenient purchasing are the main reason that the buyers purchase the product via social network. The result according to Auaree Intarapintuwat (2010) who explained that the main reason that the buyers usually buy goods online are convenience and save time for commute that according to the current situation that the consumers require to reduce the expense by select the cheaper product and reduce the time and expense for commute.

The social network users preferred to direct purchase via OTOP entrepreneur/manufacturer Facebook and purchase via Line application that according to Punlanut Dechmanon (2013) who found that customer usually select online purchasing because the convenience and normally purchase vis Line application.

The social network users spent 500-1,000 Baht for OTOP purchasing per time and normally used bank transfer for payment. The social network users usually make decision by themselves to purchase the goods that according to Auaree Intarapintuwat (2010) who described that the sample always paid for goods by bank transfer and the influence factor to make a decision to purchase the goods is themselves. Therefore, the result represented that the consumer have power to making decision by themselves and preferred complete convenience from purchasing procedure to payment process because there is internet banking system in current days.

The problem that the social network users found when purchasing OTOP product via social network consisted of product quality does not match with the description and defective goods from delivery. The result of this study according to Atitaya Karnrew et al. (2011) who explained that the disadvantaged/limitation of online purchasing are some unstandardized goods, low quality, the buyers cannot bargain, some goods are expensive, delay delivery, lack of safety, and exaggerated advertising.

Conclusion

This study represented the changing of consumer behavior affected from technology and online media. Therefore, the community enterprise entrepreneurs should maintain product standard quality with creates business opportunity by increasing the distribution channels via social network. The distribution channel should develop and apply consistent customer needs based on social network online marketing. According to the result of this study, there are some subjects that the community enterprises entrepreneurs should attend as:

Most of the social network users who purchased OTOP product were working people, thus the entrepreneurs should provide the product that responds working people needs. The working people normally attend on benefit and quality of product, more complicate decision making than teenager, and reasonable spend. Therefore, the OTOP entrepreneurs should indicate and maximize the product quality to increase competitive advantage.

The income of social network users who purchased OTOP product was 10,001-15,000 Baht per month and average spend was 500-1,000 Baht. The purchasing reasons were the price is cheaper than other distribution channels, convenient purchasing procedure, and save time for commuted, therefore, the sellers should provide proper size product with necessary price. The bestselling product is cloth and costume that there are a lot of direct competitors (other OTOP entrepreneurs) and indirect competitors (cloth and costume sellers), thus to provide reasonable price, cheaper price than competitors, offer approximately market price could make the social network users easier decision making. Furthermore, the OTOP entrepreneurs should provide various social network channels, support many applications, and quick response to the customer request to maximize the customer satisfaction and following to consistent situation.

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SERVICE MARKETING MIX AFFECTING, WITH SALES PERFORMANCE AND REPURCHASE IN SOUVENIR STORE OF THALE NOI AREA, PHATTHALUANG, THAILAND

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Abstract

Tourism is the significant industry to generate the income to Thailand, especially when the tourists arrive to the destinations and purchase souvenirs to remind them the memorable experience. This study is quantitative research purposed to analyze the relationship between service marketing mix influenced to sales performance and repurchase in souvenir shop of domestic tourists in Talay Noi area, Phatthaluang Province. The data collected from 400 domestic tourists by face to face and selected by convenience sampling. The Likert scales questionnaire divided into 5 levels. The data collecting consumed 6 months between March-August 2016. The data analyzed by descriptive statistics, Pearson's Product Moment Coefficients and Multiple Regression for analyze relationship between variables. The result found that the service marketing mix factors that have positive relationship of sale performance and repurchase is marketing promotion ($r=.438$, $p<.01$), personal selling ($r=.771$, $p<.01$), souvenir product ($r=.472$, $p<.01$), process of service ($r=.438$, $p<.01$), atmosphere in the shop ($r=.403$, $p<.01$), and pricing ($r=.133$, $p<.05$). The factors influenced to predictive power of sales performance and repurchase are marketing promotion, process of service, personal selling, and souvenir product. These factors calculated as 78.2% predictive power and 0.217 standard error of the estimate. Therefore, the souvenir shops should develop the marketing mix strategy to increase repurchase that could generate income and increase product value.

Keywords: sales performance, repurchase, service marketing, souvenir product

Introduction

Thale Noi is the waterfowl reserve that is the significant tourist destination of Phatthaluang Province because the good climate, beautiful landscape, and there are various kinds of plants and resident waterfowl all year and migratory birds that visit in winter every year. There are land and water tourist activities provided to the tourists such as nature walks, sailing to view the nature and local lifestyle, visit floating market, and shopping the souvenirs. These activities could attract both domestic tourists and foreign tourists and could generate income amount 1,902 million Baht to Phatthaluang Province in 2013 (National Statistical Office, 2014)

The information from Tourism Authority of Thailand (2013) represented that 93.4% is domestic tourists and 6.6% is foreign tourists. The interesting tourist activity that tourists paid attention with is shopping the souvenirs especially the souvenir related to local lifestyle and local culture such as local sedge mat, shadow puppet keychains, and coconut shell product. Tourism Authority of Thailand (2013) reported that the domestic tourists spent for shopping the souvenirs 14.05 % and the foreign tourists spent for souvenir 16.05%.

There are a lot of souvenir shops in shopping area of Thale Noi that provided various kinds souvenir to the tourists. Souvenirs are universally associated with tourism as a commercially produced and purchased object to remind the purchaser of the experience. Selling souvenirs has always been part of the tourism experience and contributes to the viability of the retail trade in many tourism destination areas (Jansen-Verbeke, 1998). Therefore, the souvenir shop operators need to establish the value of the product and differentiate the product from the competitors to attract target market (Mattson, 1982).

To bring local arts, culture, environment, original physical appearance of local community and beautiful nature to establish the value of souvenir shops by using interior and exterior design such as create the symbol of the shop, the way to display the products in the shop, planning layout, nice atmosphere, included salesperson that could assist the client in the shop (Aphinya Sakdasirorat and Adisara Laaonpansaloon, 2015).

The study of (Lewison & Delozier, 1989) which consistent with the study of Wasan Kantvorarat (2016) has an additional issue beside their study that show the factors which motivate Thai tourists to buy pottery as a souvenir from the retailer. These factors are composing of; decoration style, uniqueness, interesting interior design, outstanding signage, and convenient of parking lot. The study of Padon Armart (2008) also shows study of customer's behavior at souvenir shop, the customer mainly focuses on the following issues; cleanliness of the shop, the convenient of location to travel, and the appropriate atmosphere. These factors could motivate both domestic tourists and foreign tourists to visit and purchase the souvenir that could claimed that this activity could generate the direct income to the souvenir shops in shopping area in Thale Noi. Aphinya Sakdasirorat and Adisara Laaonpansaloon (2016) described that the retail sellers of souvenir product tended to be more competitive to attract the interest of the tourists.

Furthermore, the previous studies found that the souvenir that sold in tourist attraction had no difference. The souvenir product such as T-shirts, key chains, fabric bags, glasses or post cards are similar and they only changed the logo or the tourist attraction's name. This issue is one of the reasons that the tourists do not want to buy the souvenir because most of them are similar. The result according to Yongyoot Chairatanawan (2014) who found that the souvenirs and souvenir shops are not provide various products and lack of public relations, therefore they cannot attract the tourists to purchase. In the other hand, Siwarit Pongsakornrungsilp (2008) explained that the methods to attract the customer combined with the quality of product, packaging and trademark, continuous developing the new product, and reasonable price. The souvenir shop should provide the clearly trade mark, attractive decoration, and offer skillful salesperson (Padol Amart and Pradit Silaboot, 2008)

According to the study of shopping area in Thale Noi, Phatthalung Province, the result represented that some of the souvenir shops are shut down. The retailers said that most of the tourists are domestic tourists who already used to purchase the souvenir and when they found that the souvenir product are similar with the one that they purchased, therefore they did not repurchase. The result of the study and interview represented that the souvenir shops lost opportunity to earn an income, therefore they should attend to the domestic tourists group because the domestic tourists are travel all the year. If the souvenir shops could attract and satisfy the domestic tourists, the souvenir shops could increase the income and create the main target market.

The study of Service Marketing Mix Affecting with Sales Performance and Repurchase in Souvenir Product of Thale Noi area, Phatthaluang, Thailand purposed to examine the factor of marketing mix in hospitality, factors of effective selling and repurchase, and to describe the relationship between marketing mix affected to effective selling and repurchase of domestic tourists. The souvenir shops could apply this study to create marketing strategy and develop product and service in the future.

Review of literature

Souvenir store and tourist shopping

Souvenir is originally a French verb indicating the action to remember. Translated as an English noun it represents an object through which something is remembered (Swanson and Timothy, 2012). Gordon (1986) had explained that souvenirs are arts and handicrafts of each locality and they are locally produces by using locally materials for production. And use skilled workers, and mostly of the productions are from household (Suree Khemthong and Surapee Rojanavongse 2002). Kim and Littrell (2001) stated that souvenirs are unique products of each locality. They reflect the art, culture, and indigenous traditions. Tumbat (2003) mentioned that souvenirs are memorable products that most tourists are buying and bringing back to their homeland, and the main purpose is to commemorate. Suree Khemthong (2012) also mentioned the relationship of souvenirs with the tourism of Thailand that souvenirs are like the representative of tourist sites to all around the world, they are businesses that promote good cultures and traditional of country and they are perceived as a national art. Swanson & Timothy (2012) had said that souvenirs play an important role in traveling for long term. It appeared in records of Egyptians that thousands of years ago the Romans, explorers, and tourists had brought souvenir from home to travel aboard it is no surprise that tourists back home with a lot of handcrafts and artworks from place they explored and colonized (Horner, 1993; Stanley, 2000).

The souvenir product could generate the income to the country because the domestic tourists usually travel all year and continuous increase spends for souvenir. Therefore, the domestic tourists are the main target market of the souvenir shops (Darucha Rattanadamrongaksorn, 2015) that according to Jiraporn Kawsri (2013) who found that the souvenir product in Thale Noi area cound generated many income to the community. The domestic tourists normally purchase local shadow play key chains, local shadow play dolls, sedge handicrafts product, and coconut shell product. The result according to Aphinya Sakdasirorat, et al.,

(2016) who explained that most of the tourists who visited Chiang Mai Province required to purchase hand woven textile and textile products, wood carving products, and silver products. The result represented that souvenir business tends to growing with tourism activities and souvenir business is the significant business that could generate income to the resident and country.

Tourism and shopping activity is unique characteristics of tourist activity. As well as a consumer behavior perspective, tourists' shopping behavior varies from the rational and ordinary purchasing acts at home and calls for special attention (Oh *et al.,* 2004). Crompton (1979) said that vacation travel is considered ''unordinary time'' when individuals are in a break from their normal routine, which means they are not working, not serious, not responsible or not thrifty, and very likely in an escape mood. Shopping activities often link to a particular shopping context. Shopping continues to the most popular of the leisure activities of tourists. However, shopping activity is the important tourist activity (Tourism Authority of Thailand, 2014).

Shopping is a popular tourist activity and is often the most significant expenditure category for vacationers (Oh *et al.,* 2004). Generally, the tourists preferred to bring the souvenirs to their home after the trip (Gordon, 1986). Tourist shopping behavior quite different with their normally shopping behavior that was explained by Christianson and Snepenger (2002). The tourists satisfied from shopping experience separated from purchasing. Generally, the tourists did not prepare the shopping list and shopping activity usually the last program for their trip (Thomas and LeTourneur, 2001). The tourists often seeking for the outstanding product, the souvenir represented to the experience that they cannot find from their hometown, and the souvenir represented to tourist destination (Costello and Fairhurst, 2002; Paige and Littrell, 2003; Reisinger and Turner, 2002). A lot of tourists spent their money for souvenirs more than spent in the holiday or in their hometown. Furthermore, the tourists purchased clothes, art jewelry, and handicraft (Thomas and LeTourneur, 2001).

Souvenir store and intention to repurchase

This study attended to examine the connection between marketing mix and effective selling based on the antecedents and the consequences of marketing mix for hospitality. This conceptual framework originated from Kotler (1997) who described the difference between product and service as product is tangible and easy to measure while service are noted for the intangible characteristics of reparability (produced and consumed at the same time) perishability (cannot be stored), and high degree of variability. The measurement and identification of marketing mix could identify each factor in overview of satisfaction towards marketing mix of souvenir shops. If the overall satisfaction is increase, it could create stable purchase intention, increase income, and increase purchase intention. Ajzen, I. (1991) explained that intention was the theory of planned behavior that was the part of the theory of reasoned action under the limitation of the original behavior management with subjective norms and ability to control the emotions. If the intention was created by customer, it called purchase intention. The measurement of frequency of purchase intention could identify the possibility to purchase product in specific time (Whitlark et al., 1993). If the enterprises could create customer perceived value and maximize the impression to the customer, the customer normally repurchase (Buzzell & Gale, 1987 and Grönroos, 1988). Anderson, Fornell & Lehmann (1994) described that the repurchase products or reuse services is the personal attitude based on the previous experience from purchasing or service using that could create the familiarity and customer required to repeat purchasing products or using the services and conducted to repurchase products and reusing services decision making. Nevertheless, personal behavior could affected to repurchase products or reuse services behavior that according to Kim, et al., (2012) who found that repurchase products or reuse services is a result of the satisfaction towards products or services that could be internal and external factors of the customers while Ehrenberg (2002) described that the consumer behavior is the complicated behavior because before the consumer make a decision to purchase, they must had the positive attitude and had the experience from using the service and attracted by external factors as marketing promotion such as public relation activities, offering discount, provide sample or giveaway, selling by salesperson, product and packaging perception. These factors affected to decision making to purchase products or use services and the satisfaction after use products or services could became the positive attitude towards the trademark. For the souvenir product, Isara Peungsua and Natcha Pasul (2017) explained that the marketing mix factors of souvenir products had positive relation with the decision making to purchase of Bangkok Football Club Fanclub, especially the fanclub emphasized to the new product and reliable and convenient distribution. Kittisak Tammasakchai et al., (2015) studied the tourists satisfaction towards the souvenir and the result found that the tourists interested in the design, size, shape, and weight that convenience to transport and the price of souvenir should be reasonable.

Yongyoot Chairatanawan (2014) studied tourist behavior and factors affected to revisit of Wat Hyua Pla Kang, Chiang Rai Province and the result represented that the factor affected to revisit was the beautiful decoration and convenient walkway. On the other hand, this study found that the average of repurchase souvenir products was very low in statistical significance because the number of souvenir shops in the temple area was less, souvenir product was not diverse, and the souvenir shops had no promotion activities. The result according to Cohen (2000) who explained that the souvenir shops in tourist attractions should create promotion activities by using the unique production process and exhibited in special occasion to increase the sales volume. Swanson & Horridge (2006) studied souvenir product for commercial and found the tourist motivation factor to visit the destination was affected from shopping area that provided souvenirs and these motivations composed with the environment of the shops, decorating of the shops, salesperson, and sales promotion. Kankanit Wongborwornluk *et. al.,* (2017) examined the factors affected to decision making to purchase the souvenir of Chinese toursits in Pattaya, Chonburi Province and the result represented that most of the Chinese tourists spend 500-750 Yuan per time to purchase souvenir and the analysis of marketing mix factors of souvenir products consisted with product, price, place (distribution), and promotion had positive relation with decision making to purchase the souvenir in statistical significance.

Research Methodology

This study is survey research purposed to study service marketing mix (merchandise, pricing, store, marketing promotion, sales associates, and process) affected to decision making to purchase souvenir of domestic tourists in sales performance and repurchases in Thale Noi, Phatthaluang.

Data collection

Data and data collection, the survey of domestic tourists made use of structural questioner for factor affecting the service marketing mix to sales performance and repurchases in Thale Noi, Phatthaluang. These are the data of service marketing mix (merchandise, pricing, store, marketing promotion, sales associates, and process) and sales performance and repurchases of domestic tourists. The questionnaire is performed with domestic tourists after the Pre-test with 50 tourists of shopping area in Thale Noi, Phatthaluang. There are necessary because service marketing mix and sales performance & repurchases to traveling competencies needs to be value of souvenir product. The confidence of the whole questionnaire is obtained by Alpha coefficient which is found be 0.878.

Sampling

Sample and Sampling are domestic tourists who travel to shopping area in Thale Noi, Phatthaluang. The samples was selected by convenience sampling and calculated by Yamane Formula (1967) as 400 samples. The data collecting consumed 6 months between July-December 2016. Likert scales by Rensis Likert and dummy variables with the scores ranging from 1 to 5 (1 = “Not important at all”, 2 = “Not very important”, 3 = “Important”, 4 = “Very important”, and 5 = “Essential”).

Measures

Dependent variable

According to related literature of tourist's sales performance and repurchase, the dependent variable was determine as purchasing quantity, spending amount, and repurchase.

Independent variables

This study has the following independent variables; merchandise, pricing, store, marketing promotion, sales associates, and process.

Analysis

Data analysis was carried out using SPSS 17.0 statistical software to analyze the percentage, mean, standard deviation, Pearson correlation coefficient, and stepwise regression analysis respectively.

Profile of domestic tourists

According to the data collecting from 400 domestic tourists, the result represented that most of the respondents or 55.2 % are female, 51.7 % ages 21-40 years, and 43.7 % are bachelor degree education level. The souvenir that domestic tourists usually purchase is local shadow play characters (40.8 %), sedge handicrafts product (36.8 %), and t-shirts/clothes (33.5 %) as shown in Table 1.

Table 1
Profile of domestic tourists

	N	%
Gender		
Male	179	44.8
Female	221	55.2
Age		
Less than 20 year old	51	12.7
21-30 year	105	26.2
31-40 year	102	25.5
41-50 year	83	20.8
51-60 year	45	11.3
More than 60 year older	14	3.5
Level of education		
Some high school	42	10.5
High school	72	18.0
Some college	46	11.5
College graduate	175	43.7
Post graduate	65	16.3
Souvenir product		
Sedge handicrafts product	147	36.8
T-shirts/clothes	134	33.5
Local shadow play characters	163	40.8
Coconut shell product	98	24.5
Earthenware/ceramic product	91	22.8
Jewelry	88	22.0
Key chains	110	27.5

Results

The overall result of the study of 6 marketing mix factors for hospitality represented that the average is high level (Mean=3.86) based on Best (1981) and 3 highest mean factors are pricing (Mean=4.03), merchandise (Mean=3.91) and sales associate (Mean=3.87) respectively as shown in table 2.

Table 2
Mean and SD Values of service marketing mix items

Factor	Mean	SD	Level
Merchandise	3.91	0.534	Important
Pricing	4.03	0.552	Important
Store	3.74	0.565	Important
Marketing promotion	3.80	0.516	Important
Sales associate	3.87	0.556	Important
Service process	3.85	0.751	Important
Total	3.86	0.579	Important

Cronbach's Alpha = 0.744

According to the variables of desired shopping area attributes, the result found that all six variables had overall mean in high level (Mean=3.86). The top 3 factors consisted with word of mouth (Mean=3.93), the customer have positive sentiment to the shops (Mean=3.91). The amount of the souvenirs that the customers purchase per time and amount of money that the customers spend for souvenirs per time are equal (Mean=3.87) as shown in table 3.

Table 3
Mean and SD Values of sales performance and repurchase items

Factor	Mean	SD	Level
The amount of the souvenirs that the customers purchase per time.	3.87	0.732	Important
The amount of money that the customers spend for souvenirs per time.	3.87	0.661	Important
The customer shares the purchasing experience with others.	3.76	0.664	Important
The customers have positive sentiment to the shops.	3.91	0.836	Important
The customers plan to repurchase in this shop.	3.86	0.644	Important
Word of mouth.	3.93	0.824	Important
Total	3.86	0.726	Important

Cronbach's Alpha = 0.703

The analysis of correlation between the merchandise, pricing, store, marketing promotion, sales associate, and service process between with sales performance and repurchase by Pearson correlation coefficients as shown in Table 4.

Table 4
Bivariate analysis: Pearson correlation

	Merchandise	Pricing	Store	Marketing promotion	Sales associate	Service process	Sales performance and repurchase
Merchandise	-						
Pricing	.202**	-					
Store	.580**	.100*	-				
Marketing promotion	.288**	.097	.384**	-			
Sales associate	.313**	.101*	.459**	.861**	-		
Service process	.781**	.157**	.271**	.212**	.223**	-	
Sales performance and repurchase	.472**	.133**	.403**	.839**	.771**	.438**	-

Several Pearson correlations for the independent, dependent and control variables have been computed. Table 4 shows that the strongest correlations with the dependent variable (sales performance and repurchase) have been found with regard to marketing promotion (H4, r=.839, p<.001), sales associate (H5, r=.771, p<.001), merchandise (H1, r=.472, p<.001), service process (H6, r=.438, p<.001), store (H3, r=.403, p<.001). The same is applied to the pricing (H2, r=.133, p<.001) devoted to sales performance and repurchase are for the six samples. Most of the correlation coefficients have the expected sign with six independent variables evidencing a positive correlation with the dependent variable.

Stepwise multiple regression analysis of merchandise, pricing, store, marketing promotion, sales associate, and service process affected to sales performance and repurchase as show in table 5.

Table 5:
Results of stepwise regression analysis

Variable	b	SE_b	β	t	Sig
Independent variables					
Marketing promotion	.587	.041	.654	14.152	.000
Service process	.128	.023	.208	5.526	.000
Sales associate	.114	.039	.137	2.936	.004
Merchandise	.068	.033	.078	2.035	.0043
Dependent variables					
Sales performance and repurchase					

Note: $R^2 = .782$; *adjusted* $R^2 = .780$; $F = 354.940$; $p<.000$

The stepwise multiple regression analysis explained obvious understand of the determinants that significantly contribute to each desired sales performance and repurchases measure within a service marketing mix context. Preliminary statistical testing ensured compliance with regression assumptions. A discussion of each stepwise regression equation and provides insight into the key determinants of each desired sales performance and repurchases measure within a service marketing mix context.

The result represented that the variables that could forecasted desired sales performance and repurchases in Thale Noi, Phatthaluang at statistical significance .01 are marketing promotion (β =.654, $p < 0.000$), service process (β =.208, $p < 0.000$), sales associate (β =.137, $p < 0.000$), and Merchandise (β =.078, $p < 0.000$). These variables could forecast desired sales performance and repurchases 78.2% ($R^2 = 0.782$) and Std. Error of the Estimate = .217. This study presented the sales performance and repurchase that the domestic tourists preferred to purchase the souvenirs based on the variation of these four variables at 78.2% and 21.8% based on other variables.

Discussion

The study of Service Marketing Mix Affecting with Sales Performance and Repurchase in Souvenir Store of Thale Noi Area, Phatthuluang Province represented the result that according to the 4 hypothesis:

The marketing promotion has positive relation to sales performance as repurchase (H4) because promotion is the diverse communication process such as advertising via brochures and websites to present the information about products and services to make the customer perceive the value and create positive attitude of the products. The result according to Wasan Kantvorarat (2016) who studied Factors relevant to tourists' buying decision on pottery souvenirs at Koh Kret of Nonthaburi Province and found that marketing promotion made the customers memorize the product because marketing promotion is the communication between buyer and seller to create attitude and purchasing behavior. The marketing promotion could persuade and attract the customer to recognize and satisfy in the product after using, especially influence to repurchase. Oliver (1997) described that the high quality product affected to customer satisfaction. Therefore, the souvenir shops could purchase the good quality products to provide to the customers, and then the customers will satisfy and started positive words of mouth.

Service process had positive relation with sales performance and repurchase (H6). Service process is significant factor influenced to perceive value of the customers and related to satisfaction establishment and repurchase. According to Nongluk Promtingkran *et. al.*, (2017), who studied service quality of the enterprise influenced to repurchase of elderly and found that the quality of the enterprise influenced to customer perceive value due to the service quality of hospitality business is the response of customer needs over their expectation. When the customer used high quality service, it could affected to customer perceived value. The customers will estimated the quality of products or services by compared with their needs or expectations before and after purchasing that according to Ampon Shoosamuk *et. al.*, (2017) who explained that the customers who perceived increasing value could receive increasing satisfaction. The customers who satisfied could established the loyalty and repurchase.

The salesperson had positive relation with sales performance and repurchase (H5). The reliability of hospitality business is the ability to serve the promised service to the customers. Therefore, the service must served accurate and consistence to create reliability and trustable. The customers could perceive that the business or shops provided polite, attentive, proper gesture and manner including reliable salesperson that could create high delighted customer. If the customers could recognized the served service, it represented that the customers are loyalty to the product and influenced to revisit (Tharaporn Suasuri, 2013). The previous conclusion according to Nongluk Promtingkran *et. al.*, (2017) who described that customer satisfaction usually influenced from the quality of the interaction between salesperson and customers such as polite salesperson, attentive and warm welcome gesture salesperson is the factors that could establish the satisfaction toward the enterprise and conducted to repurchase.

The souvenir has positive relation to sales performance and repurchase (H1) due to souvenir represented to cultural communities that are unique and valued. The tourists normally purchase outstanding and exquisite products to remind that they used to visit these destinations and could revisit if possible and repurchase the souvenir (Darucha Rattanadamrongaksorn, 2015). The result according to Padol Amart & Pradit Silaboot (2008) who studied customers behavior and satisfaction towards souvenir purchasing and found that the quality of souvenir, attractive design, and diverse products including provide new arrival products affected to customers satisfaction and became the loyalty to repurchase.

Conclusion

The study of Service Marketing Mix Affecting with Sales Performance and Repurchase of domestic tourists represented 4 significant factors as marketing promotion, service process, salesperson, and souvenir products. These factors affected to repurchase behavior of domestic tourists to remind that they used to visit the destinations.

The souvenir products have high potential to generate the income to the local, region, and country along with tourism industry. Therefore, the souvenir stores should establish customer satisfaction by decorate and design the layout of the store to facilitate the customers including present store image based on local unique and physical identity and culture to create positive satisfaction and customer could perceive the value. Furthermore, offering discount or provide special price could attract and motivate customer decision making to purchase. The tourists normally attend to quality and advantage of the souvenir, therefore the tourists could recognize the quality of product and perceived that the price is reasonable that could conduct to loyal and repurchase.

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THE EFFECTIVENESS OF PEER TEACHING AND THE LANGUAGE BARRIER IN COMPARISON OF MARKETING STUDENTS OF HIGH EDUCATION IN THAILAND

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ABSTRACT

This research intends to investigate the perceptions of university level students of higher education about their attitudes, effectiveness and improvement in active learning through group peer teaching in the real classroom each week. A total of 70 students consisting of 2 separate classes were the respondents with the comparison of different language used namely Thai and English, for same teacher. The group peer teaching taught the course for 14 weeks allowing the 1st week for teacher's class introduction and instructions. The students prepared class materials, discussed with teacher/researcher, received teacher's comments and taught the course to their peers in the classroom.

Giving out questionnaires and general observation were the methodology in this research to investigate students' perceptions of peer teaching method. After, the normality tests were used, the statistical analysis of data discovered that students felt actively engaged and received many benefits in their studies through group peer teaching. Moreover, score between midterm and final examination was also statistically calculated. Peer teaching method can be positively used in higher education in Thailand on the conditions that the teacher as an assistant and facilitator is highly vigilant, articulate and attentive to the students.

Keywords: peer teaching; higher education; peer teaching method; traditional teaching method;

Chapter 1: Introduction

Despite the globalization, many countries' citizens are still having poor English language or minimal improvement on communication with foreigners. In South East Asia, Asean Economic Community (AEC) was formed in hope for mutually and equally benefits to one country to another. This basically motivates citizens from different countries to communicate in English language. Rajamangala University of Technology Krungthep (RMUTK) is a public university located in the center of Bangkok, Thailand and has realized the importance of English language for the students. Business curriculums in the local language and English are offered to students under Thai Business Administration and International College of RMUTK respectively. Although English language is one of many ongoing problems for most students in this country, there are other areas that need to be mentioned as well. Meanwhile, traditional teaching method of normal lecture, presentation and group work may be not suitable to the students here beyond 2017. Hence, the traditional teaching method does not prioritize the reflective thinking which is related to the processes of analyzing and making judgments about what is happening in class (Zeichner, 1993). Other Research's finding such as of Rotzien (2005) points out that active learning is the key to good students' engagement. This can happen by using hands-on participation or peer teaching method to encourage them in class. Traditional teaching method is yet again on the opposite side of active learning. More importantly, traditional teaching method does not motivate the students' engagement. This is a vital part which was stated in the research done by Fredricks et al (2004) that the long-term student engagement is a predictor of student learning, achievements and graduation from university. Designing and implementing a new and suitable methodology to run the classroom is recommended. In this research, peer teaching method will be used in class and measured by statistical program.

This research is aimed to test 3 areas with the implication of peer teaching method. Firstly, the evaluation of the teacher for peer teaching method since teacher is the main driver of the class. Secondly, the attitudes of the students in *before* and *After* peer teaching by group of students in actual class. This is the testing to find out whether or not students have benefited from this methodology. Last, the comparison between the midterm against the final score of the class as they are more familiar with peer teaching method throughout the semester. Therefore, it is expected to be an improvement in final score. To conclude the effect of peer teaching, this research also analyzes and runs the statistically significant differences between the two different sections in term of language use in class of the same marketing subject.

Chapter 2: Literature Reviews

Over 4 decades ago, Goldschmid and Goldschmid (1976) identified peer teaching models which include the student learning group (SLG) model. Later, it brought out self-guided groups that are used to encourage peer learning and assist students with different abilities. With considerable evidence, Goldschmid and Goldschmid (1976) suggested that this peer teaching method can be used with other teaching and learning methods. More skills in social interaction, better cooperation and active participation were for both of student teachers and student learners. Slotnick et al (1981) conducted research on cooperative learning of undergraduate student in large psychology classes at the undergraduate level and presented findings that method such as peer teaching method produces good relationship between student teachers and learners which peers have the ability to be highly influential. Tsang and Wong (1996) reveal the benefit of the peer teaching in form of the participants were able make better judgments about their teaching decisions. Furthermore, peer teaching method is quite effective technique for students in classroom because it simply transfers the theory on subject into practice in education programs whether it is done by normal peer teaching or video recording (Kpanja, 2001). According to research conducted about level of comfort of students by McIntyre et al (2005) the world offer more modern technology, the trend is that they demand greater autonomy and independence in classroom learning than they usually receive. Therefore, peer teaching method is one way that teacher could apply to adapt to their needs. In Turkey, Ogeyik (2009) presented research findings and concluded the attitudes of the students toward the method of peer teaching that they held positive in general. As the students are required to prepare teaching materials, developing into professional mindset and sharpening the creativity were keys to deliver lessons in classroom instead of listening to the teacher only. With other upsides from another research, important factors for students such as discipline, general responsibilities, confidence, and management of time, obedience and ability to express and carry out ideas inside and outside the class are benefits of the peer teaching method (Vasay, 2010). Ali et al (2009) strengthen the benefits of peer teaching by pointing out the downfalls of the traditional lecture method that it has been characterized by less involvement, no innovation, no consultation with teachers, not being innovative, boring, less development and monotonous. In more recent year, Lim (2014) conducted a research with longer time frame on different semesters. There was positive score of passing rate which increased from 83% up to 92% from one year before when the peer teaching was not the methodology applied to class.

Despite all benefits and upside of the peer teaching method, Courneya et al (2008) recognize and argue that this method is not quite easy to accomplish since it provokes anxiety and stress to the students who do not have any experiences to teach the class before. Courneya et al (2008) reported that in their study participating students at the beginning often expressed the level of stress. This may directly lead to the ineffectiveness of the students. Especially, when English language is used in class of International College, peer teaching method to their peers in class might emerge as twice more difficult to accomplish.

Chapter 3: Methodology

-Type of respondents-

Within Business Thai program and International College of RMUTK, the students are the 3rd year and beyond in marketing major who have been assigned to participate in this peer teaching research. Due to the fact that peer teaching method is difficult and not common in Thailand, the 1st and 2nd year students are ignored from this research. The total of 70 participants was separated into two groups, Thai program and International College with 42 and 28 students respectively. In order to encourage fairness, each group selection of students was assigned by the teacher with one strong academic student with high GPA. This means every peer teaching group contains at least one good, average and poor student on purpose. Since the Thai program has more students at 42, they were divided into 14 groups with 3 members. Meanwhile, the International College were divided into 14 groups with 2 members in order to round up data and make it easier to run in statistical software (see table below).

Rajamangala University of Technology Krungthep (RMUTK)				
Subject	Program	Number of students	Language used in class by teacher	The abbreviation for statistical analysis
International Marketing	Business Thai program	42	Local **Thai** language	THAILAN
	International College	28	**English** language	ENGLAN

-Research Question and Hypotheses-

Hypothesis for testing the positive effects of the respondents

H_{01}**:** Peer teaching method does not have positive effects to the students in each class.

H_{a1}**:** Peer teaching method has positive effect to the students in each class.

Hypothesis for testing of improvement in test score of the respondents (Midterm V.S. Final)

H_{02}**:** After the period of time, peer teaching method does not have positive effect on the test score of students in each class.

H_{a2}**:** After the period of time, peer teaching method has positive effect on the test score of students in each class.

-Data Collection and Procedure-

To collect data in research, especially in education industry, questionnaire is quite a common technique (McMillan and Schumacher, 2001). In this research, data were collected quantitatively rather than qualitatively by the questionnaires handed out by the teacher after the final examination. However, questionnaire has limited the answers from the respondents only allowing them to provide data for what they like or dislike in number scale (Thomas et al., 2011). Age, educational level, occupation and marital status are excluded in the questionnaire in the part for description of respondents for both groups due to the fact that every respondent are 3rd year student and beyond in the university. It is uncommon for the 70 students to have a job and to get married.

The duration of the International Marketing Subject is approximately 5 months from June to October 2017 which is considered to be the first semester in Thai academic university calendar. To avoid the mistakes and disqualified questionnaires, the teacher of this subject clearly and personally explained the purpose of this research to students in class in both sections and scanned incomplete questionnaires filled by the students with the assistance of volunteered students from different classes. All information and questions in the questionnaires are translated into local Thai language by the researcher despite the fact that one class is taught in English. The design of questionnaire includes students' general information and idea of peer teaching method activities as one of the significant elements in educational research is feedback (Amobi, 2005).

Students' perceptions on the teacher, the teacher evaluation, was taken on 5-point-Likert-scale ranging from 1 (strongly disagree) to 5 (Strongly agree) in order to ensure teacher's commitment as a first part of questionnaire. The second part of the questionnaire consisted of ***Before*** and ***After*** questions addressing their feeling and perceptions about peer teaching method against the traditional teaching method in area such as level of benefits, level of motivation, encouragement to learn or search new knowledge autonomously and continuation of the method. This part also applies the same scale of teacher's evaluation. In third part of the questionnaire, it does not include the midterm and final score which is calculated and collected from the teacher's record. In fact, the midterm score is considered as ***Before*** and the final exam score is considered as ***After***.

-Data Analysis-

Before moving to the next stage, hypothesis testing, it is obligatory to make sure the normality for data of 6 variables for 2 separated groups. In the test, if the score is not closer to 0 and more than 0.05, the data collected are normally distributed. All of the results of **Kolmogorov-Smirnov test** are greater than 0.05, this research concluded that the data are normal to test in statistical software rather than the nonparametric test.

Kolmogorov-Smirnov test for data collected		
Variable	Significant Level	
	THAILAN N = 42	ENGLAN N = 28
Benefits from implementing peer teaching method	0.099	0.131
Peer teaching as a better method than traditional one	0.230	0.256
Peer teaching on student's motivation against traditional method	0.234	0.257
Peer teaching encouragement to learn or search new knowledge autonomously	0.269	0.124
Peer teaching method continuation for the next semester	0.451	0.365
Test score (Midterm V.S. Final) with peer teaching method	0.181	0.509

Source: researcher's calculation

The Statistical Package for the Social Sciences (SPSS) was used to calculate the difference between the ***before*** and ***after*** peer teaching method by running the One sample T-test function. Statistical number such as the mean, standard deviation, standard error mean, T-score and P value are tested and included in results and findings in the next chapter with the significant level $\alpha = 0.05$. In this research, data in both groups for the comparison between midterm and final exam of the participants are normally distributed since the midterm and final examination have been designed in the exact same number of questions and format in term of True or False, multiple choices and matching without the essay question.

Chapter 4: Results and Findings

Table 1: Description of Respondents for both classes

Category	Description	Frequency	Percentage (%)
Have you heard of Peer Teaching Method Before?	No	56	80
	Yes	14	20
Gender	Male	33	47.14
	Female	37	52.86
Student's GPA	Below 2.0	4	5.71
	2.0-2.5	23	32.86
	2.5-3.0	19	27.14
	3.0-3.5	18	25.71
	More than 3.5	6	8.57

At the beginning, the questionnaire was specifically designed for teacher as a facilitator evaluation in order to control and run the class of peer teaching effectively. Students in Both class of THAILAN and ENGLAN filled in the questionnaire and the simple calculation results are shown in table below.

Table 2: The evaluation score of the teacher for peer teaching method

Teacher's Evaluation topics by students in both class	Average score of THAILAN (42 students)	Average score of ENGLAN (28 students)
Clear instruction since week 1	3.52	4.11
Teacher's advice outside the classroom	3.90	3.83
Providing sufficient time to complete the Peer Teaching Method	3.71	3.94
The average score of the 3 parts above	**3.71**	**3.96**

In summary, the total average score of the 3 evaluations from the questionnaire indicates that ENGLAN has higher score of 3.96 compared to THAILAN at 3.71 which is slightly different than one another. There, teacher's evaluation was considered to be satisfied by students since it is higher than 3.5.

Table 3: Calculation of level of benefits from implementing the peer teaching method

One-Sample Statistics

Category	N	Mean	Std. Deviation	Std. Error Mean
THAILAN (Benefits)	42	.8810	1.58040	.24386
ENGLAN (Benefits)	28	.6429	1.49603	.28272
THAILAN (Better method)	42	.0476	1.73841	.26824
ENGLAN (Better method)	28	.7143	1.53616	.29031
THAILAN (More motivation)	42	.1429	1.57064	.24235
ENGLAN (More motivation)	28	1.1429	1.71517	.32414
THAILAN (Encourage to search autonomously)	42	.4286	1.71283	.26430
ENGLAN (Encourage to search autonomously)	28	.8214	1.67892	.31729
THAILAN (Continuation for next semester)	42	-.0476	1.56099	.24087
ENGLAN (Continuation for next semester)	28	.2857	1.58365	.29929

One-Sample Test

Category	Test Value = 0 95% Confidence Interval of the Difference			
	t-score	Df	Sig. (2-tailed)	Mean Difference
THAILAN (Benefits)	3.613	41	.001	.88095
ENGLAN (Benefits)	2.274	27	.031	.64286
THAILAN (Better method)	0.178	41	.860	.04762
ENGLAN (Better method)	2.460	27	.021	.71429
THAILAN (More motivation)	0.589	41	.559	.14286
ENGLAN (More motivation)	3.526	27	.002	1.14286
THAILAN (Encouragement to search autonomously)	1.622	41	.113	.42857
ENGLAN (Encouragement to search autonomously)	2.589	27	.015	.82143
THAILAN (Continuation for next semester)	-0.198	41	.844	-.04762
ENGLAN (Continuation for next semester)	.995	27	.348	.28571

For THAILAN, the results for **benefits** of peer teaching method showed from 42 students with T-score and P Value are 3.613 and 0.001 respectively. This rejected hypothesis since the P-Value is less than 0.05. For ENGLAN, the results showed from 28 students with the T-score and P-Value are 2.274 and 0.031 respectively. This also rejected the hypothesis since the P-Value is less than 0.05. In comparison between the 2 groups of respondents, both hypotheses were rejected by looking at the calculation on table 3 above. However, the P-value of ENGLAN is much closer to not having enough evidence to reject the hypothesis.

In the 3 categories of testing for *better method, more motivation and encouragement to search autonomously,* the results are similar for both groups. The results showed from 42 students the P-Value of 0.860, 0.559 and 0.113 respectively for THAILAN. In contrast, the results showed from 28 students *the P-value of 0.021, 0.002 and 0.015 respectively for ENGLAN.* It indicates that the first group THAILAN disagrees with peer teaching method as the numbers are more than 0.05 providing not enough evidence to reject the hypothesis. In contrast, the other group's numbers are all lower than 0.05 rejecting the hypothesis. The students who study in English language are realized that peer teaching method is better, has created motivation and encourages students in class to search for class materials autonomously compared to the traditional class.

Moreover, the last 2 rows of table 3 for THAILAN and ENGLAN group have P-value score of 0.844 and 0.3488, which the hypothesis cannot be rejected. From above calculation, there is similarity when testing whether or not they are encouraged to face the peer teaching method again for next semester. Majority of respondents insists and prefers the traditional method rather than peer teaching one.

Table 4: Testing of improvement in test score (Midterm V.S. Final) for implementing the peer teaching method

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
THAILAN	42	1.6631	4.94613	.76320
ENGLAN	28	1.7321	3.82119	.72214

One-Sample Test

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
THAILAN	2.179	41	.035	1.66310	.1218	3.2044
ENGLAN	2.399	27	.024	1.73214	.2504	3.2138

The results of THAILAN showed from 42 students with the mean, standard deviation and standard error mean of 1.6631, 4.94613 and 0.76320 respectively. T-score and P-Value are 2.179 and 0.035. Meanwhile, ENGLAN the results showed from 28 students with the mean, standard deviation and standard error mean of 1.7321, 3.82119 and 0.72214 respectively. T-score and P Value are 2.399 and 0.024.

After the students are more familiar with the peer teaching method, this research finds the improvement in score from the midterm against the final score. By calculating for THAILAN and ENGLAN, the P-Value score are 0.035 and 0.024 respectively. They both reject the hypothesis since it is less than 0.05 and provide evidence that peer teaching method has positive effect on the test score of students in each class after they are more familiar with the new method.

Chapter 5: Conclusion

Allowing students to pass the class with minimum effort may be an easy way for the university teachers. However, tough assignment tasks would not hinder the student engagement if such challenge is associated with swift feedback from teacher (Kuh et al., 2005). In order to accomplish that, peer teaching method has been implemented and tested in this research to find out any differences. By looking at the good teacher's evaluation score (see Table 2), the students in this research has allowed this research to pass the beginning step of peer teaching method.

The upside of randomly assigning students into group to perform the peer teaching in class instead of the teacher is that they are automatically required to discuss, explain, analyze, process, show, relate, generalize and justify their understanding if they attempt to teach the class effectively. Hence, the peer teaching method visibly makes them becoming involved with the chapter rather than just remembering for exams (Kassner, 2002). Besides factor of language barrier, active students enjoyed applying themselves in peer teaching method. Similarly, the low-effort students in this research are forced to prepare and teach the class with other members. There is no evidence that all respondents were highly satisfied with the peer teaching method. However, the attempt is beneficial for their developments since they were able to put theory into practice and bridge the gap between theory and practice (McKenna & French, 2010). Furthermore, the benefit of peer teaching method in this research is that it permits the teacher to demonstrate the students to the realities of teaching, allowing to them to try and improving their skills in class are the outcomes of this testing which is related to previous research by Peker (2009).

Despite the fact that both group of students provided confirmation that peer teaching method bring benefit to them against the traditional method, other factors such as peer teaching as a better method, better motivation and encouragement in their searching showed discrepancies. Those three factors' score for THAILAN did not have enough evidence to reject the hypothesis stating that they do not believe in peer teaching method. However, those three factors' score for ENGLAN rejected the hypothesis stating that they believe in peer teaching method against the traditional one.

To prove that the peer teaching method has the potential and ability to replace traditional method, the final scores were used for comparison against the midterm scores in the last part of calculation. As expected, both THAILAN and ENGLAN received higher marks in final exam. Ironically, when asking both groups whether or not they prefer to face this peer teaching in the next semester, the last 2 rows of Table 4 shows strong evidence that both classes refuse to face this effective method again. Perhaps, this can reflect the Higher Education regarding the level of low work ethic of the recent Thai students in 21st century.

Limitations of Research and Suggestion

To make this peer teaching assignment work effectively, learning is related to the effort being built by the students. The limitations such as lack of effort and ambition were frequently found after they have been assigned to work in group (Bigge and Shermis, 1999). For instance, half of the group leaders informed the teacher about specific student who does not consistently participate in group work.

Additional categories of respondents such as age, marital status and different range of jobs may be included in order to have better results. However, it would require more sophisticated software of statistic to run those data. Furthermore, the traditional way of teaching is quite obsolete and does not have any good impacts on students. A new deep learning approach should be identified and implemented to students in classroom. Surface approaches and repetition of information are just intention to pass the tests or class, not understanding of the subject matter (Barab and Plucker, 2002). Therefore, the peer teaching is one of the methods applied in this research and should be tested again in the future.

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