EFFECTIVENESS OF THE FOOD EXPERIENCE PROGRAM ON PROMOTING VEGETABLE AND FRUIT CONSUMPTION AMONG KINDERGARTEN CHILDREN

KINGKARN IEDSEE

A THESIS SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR
THE DEGREE OF MASTER OF SCIENCE (PUBLIC HEALTH)
MAJOR IN NUTRITION
FACULTY OF GRADUATE STUDIES
MAHIDOL UNIVERSITY
2005

ISBN 974–04–6035–6

COPYRIGHT OF MAHIDOL UNIVERSITY

Copyright by Mahidol University

Thesis
entitled

EFFECTIVENESS OF THE FOOD EXPERIENCE PROGRAM ON PROMOTING VEGETABLE AND FRUIT CONSUMPTION AMONG KINDERGARTEN CHILDREN

Kingkarn Iedsee
.....
Miss Kingkarn Iedsee
Candidate

Chutima Sirikulchayanonta
.....
Assoc.Prof.Chutima Sirikulchayanonta,
M.D., Diplomate Thai Board of Pediatrics.
Major-Advisor

.....
Asst.Prof.Suwat Srisorrachatr, Ph.D.
Co-Advisor

Poonsook Shuaytong
.....
Assoc.Prof.Poonsook Shuaytong, M.Sc.
Co-Advisor

.....
Assoc.Prof.Rassmidara Hoonsawat,
Ph.D.
Dean
Faculty of Graduate Studies

Chutima Sirikulchayanonta
.....
Assoc.Prof.Chutima Sirikulchayanonta,
M.D., Diplomate Thai Board of Pediatrics.
Chair
Master of Science(Public Health)
Major in Nutrition
Faculty of Public Health

Copyright by Mahidol University

Thesis
entitled

EFFECTIVENESS OF THE FOOD EXPERIENCE PROGRAM ON PROMOTING VEGETABLE AND FRUIT CONSUMPTION AMONG KINDERGARTEN CHILDREN

was submitted to the Faculty of Graduate Studies, Mahidol University
for the degree of Master of Science (Public Health) Major in Nutrition
on
20 April, 2005

Kingkarn Iedsee
.....
Miss Kingkarn Iedsee
Candidate

Chutima Sirikulchayanonta
.....
Assoc.Prof.Chutima Sirikulchayanonta,
M.D.,Diplomate Thai Board of Pediatrics.
Chair

Suwat Srisorachatr
.....
Asst.Prof.Suwat Srisorrachatr, Ph.D.
Member

Chanya Siengsanor
.....
Assoc.Prof.Chanya Siengsanor,
M.P.H.
Member

Poonsook Shuaytong
.....
Assoc.Prof.Poonsook Shuaytong, M.Sc.
Member

Rass Hoon
.....
Assoc.Prof.Rassmidara Hoonsawat,
Ph.D.
Dean
Faculty of Graduate Studies
Mahidol University

C. Chaikittiporn
.....
Assoc.Prof.Chalermchai Chaikittiporn,
Dr.P.H. (Epidemiology)
Dean
Faculty of Public Health
Mahidol University

Copyright by Mahidol University

ACKNOWLEDGEMENT

The success of this thesis could not have been met without the kind advice of many persons. I would like to express my sincere gratitude and deep appreciation to my dissertation advisory committee for their kindness and invaluable suggestion throughout the course of this study: my major advisor, Associate Professor Chutima Sirikulchayanonta M.D. and my associate advisor, Assistant Professor Dr. Suwat Srisorrachatr and Associate Professor Poonsook Shuaytong.

I would like to thank Associate Professor Chanya Siengsanor who was the external examiner of the thesis defense and guidance for complete content of this thesis. I also thank Mr. Thomas Mcmanamon for editing the English language of my thesis.

I would like to thank the staffs and teachers of the samples at Sukhothai school for kind arrangement of facilities, co-operation and generous assistance, and also the students participating in the program. I also would like to thank my friends and siblings for their great assistance in the program intervention, wonderful friendships and providing facilities.

I would deeply like to thank my parents who gave me a life and loving and provided great opportunities for the best studies possible throughout my life. I also deeply wish to thank Mr. Chanyut Vijaranayan for encouraging and helping me in so many ways that enable me to complete this study.

Finally I am very appreciated and special thanks to Mahidol University, a place which I received a lot of knowledge and experiences.

Kingkarn Iedsee

Copyright by Mahidol University

EFFECTIVENESS OF THE FOOD EXPERIENCE PROGRAM ON PROMOTING VEGETABLE AND FRUIT CONSUMPTION AMONG KINDERGARTEN CHILDREN.

KINGKARN IEDSEE 4436055 PHPH/M

M.Sc. (PUBLIC HEALTH) MAJOR IN NUTRITION

THESIS ADVISORS: CHUTIMA SIRIKULCHAYANONTA, M.D.(THAI BOARD OF PEDIATRICS), SUWAT SRISORRACHATR, Ph.D.,
POONSUK SHUAYTONG, M.Sc.

ABSTRACT

Vegetables and fruits are emphasized as important foods for health or as protective food but vegetable and fruit consumption is lower than what health officers recommend. Additionally, positive behaviors are more easily set and negative habits prevented during childhood than adulthood. The preschool child is at the beginning age to form definite responses to various types of food. Thus, childhood represents an ideal time to intervene to improve dietary behaviors and encourage positive vegetable and fruit-eating habits.

The purpose of this research was to study the effectiveness of the food experience program on promoting vegetable and fruit consumption among kindergarten children. This study was the quasi-experimental research of one group. Kindergarten students studying at K1 level in Sukhothai School, Bangkok metropolitan area, were purposively selected as the subject of this study. The study was conducted from July until September, 2003. This study applied concept of the food experience along with the Social Learning Theory as guidelines for the program. The intervention consisted of 11 activities during 8 consecutive weeks. Data collection for evaluation of this study was conducted by direct lunch observation at school.

The results revealed that the kindergarten children's vegetable consumption was significantly increased in all of the different kinds, in the amounts of vegetable intake, and in the scores of vegetable eating behavior (p-value < 0.05). For fruit consumption, their fruit intake was significantly increased in the amounts of fruit intake (p-value < 0.05) and in the scores of fruit eating behavior (p-value < 0.05) but the kinds of fruit intake was not significantly increased after the intervention.

These results have shown that the food experience program can promote vegetable and fruit consumption behavior among kindergarten children. Therefore, it is recommended that this program should be applied and extended to other similar socio-demographic groups.

KEY WORDS : FOOD EXPERIENCE / VEGETABLE AND FRUIT CONSUMPTION / KINDERGARTEN CHILDREN

138 P. ISBN 974–04–6035–6

Copyright by Mahidol University

ประสิทธิผลของการส่งเสริมการบริโภคผักและผลไม้ในเด็กอนุบาลโดยใช้ประสบการณ์เกี่ยวกับอาหาร
(EFFECTIVENESS OF THE FOOD EXPERIENCE PROGRAM ON PROMOTING VEGETAVLE AND FRUIT CONSUMPTION AMONG KINDERGARTEN CHILDREN)

กิ่งกาญจน์ เอียดสี 4436055 PHPH / M

วท.ม. (สาธารณสุขศาสตร์) สาขาวิชาเอกโภชนวิทยา

คณะกรรมการควบคุมวิทยานิพนธ์: ชุติมา ศิริกุลชยานนท์, พ.บ.,วว.(กุมารเวชศาสตร์),
สุวัฒก์ ศรีสรฉัตร, สค.ด.(สังคมศาสตร์การแพทย์และสาธารณสุข), พูนสุข ช่วยทอง, วทม.(การเจริญพันธุ์และวางแผนประชากร)

บทคัดย่อ

ผักและผลไม้เป็นอาหารที่สำคัญต่อสุขภาพหรือเป็นอาหารป้องกันโรค แต่พบว่าการบริโภคผักและผลไม้อยู่ในระดับต่ำกว่าคำแนะนำอาหารบริโภค การส่งเสริมพฤติกรรมที่ดีและการป้องกันพฤติกรรมไม่พึงประสงค์นั้นควรเริ่มต้นในวัยเด็กซึ่งง่ายกว่าวัยผู้ใหญ่ เด็กวัยก่อนเรียนเป็นวัยเริ่มเรียนรู้และสร้างสุขนิสัยจึงเป็นวัยที่ควรสร้างเสริมพฤติกรรมการบริโภคที่เหมาะสมโดยเฉพาะพฤติกรรมที่ดีในการรับประทานผักและผลไม้

การศึกษาครั้งนี้มีวัตถุประสงค์เพื่อศึกษาประสิทธิผลของการส่งเสริมการบริโภคผักและผลไม้ในเด็กอนุบาลโดยใช้ประสบการณ์เกี่ยวกับอาหาร เป็นการวิจัยแบบกึ่งทดลองกลุ่มเดียว กลุ่มตัวอย่างเป็นนักเรียนที่กำลังศึกษาอยู่ชั้นอนุบาล 1 โรงเรียนสุโขทัย กรุงเทพมหานคร ดำเนินการศึกษาตั้งแต่เดือนกรกฎาคมถึงเดือนกันยายน พ.ศ. 2546 ในการศึกษาได้นำแนวคิดประสบการณ์เกี่ยวกับอาหารร่วมกับทฤษฎีการเรียนรู้ทางสังคมมาประยุกต์ใช้ในการจัดกิจกรรม การทดลองประกอบด้วยการจัดกิจกรรม 11 ครั้ง ใน 8 สัปดาห์ รวบรวมข้อมูลเพื่อประเมินผลการศึกษาโดยการสังเกตการรับประทานอาหารกลางวันและประเมินปริมาณอาหารที่รับประทานได้ที่โรงเรียน

ผลการศึกษาพบว่าการบริโภคผักของเด็กอนุบาลเพิ่มขึ้นอย่างมีนัยสำคัญทั้งชนิด ปริมาณและคะแนนพฤติกรรมการบริโภคผัก ($p\text{-value} < 0.05$) สำหรับการบริโภคผลไม้พบว่าเพิ่มขึ้นอย่างมีนัยสำคัญในด้านของปริมาณและคะแนนพฤติกรรมการบริโภคผลไม้ ($p\text{-value} < 0.05$) แต่ในด้านชนิดของผลไม้ที่บริโภคไม่เพิ่มขึ้นภายหลังการทดลอง

ผลการวิจัยชี้ให้เห็นว่า ประสบการณ์เกี่ยวกับอาหารมีประสิทธิผลต่อการส่งเสริมพฤติกรรมการบริโภคผักและผลไม้ในเด็กอนุบาล และสามารถนำไปประยุกต์ใช้ในกลุ่มตัวอย่างอื่นต่อไป

138 หน้า ISBN 974–04–6035–6

Copyright by Mahidol University

CONTENTS

		Page
ACKOWLEDGEMENT		iii
ABSTRACT (ENGLISH)		iv
ABSTRACT (THAI)		v
LIST OF TABLES		viii
LIST OF FIGURES		x
CHAPTER		
I	INTRODUCTION	
	Background	1
	Research Question	5
	General Objective	5
	Specific Objectives	5
	Research Hypothesis	5
	Research Variables	5
	Scope of the Study	6
	Limitation of the Study	6
	Definitions of Terms	7
	Summary of Conceptual Framework	8
II	LITERATURE REVIEWS	
	Part 1 The importance of vegetable and fruit consumption	
	- Knowledge about vegetables and fruit	10
	- Components and nutritional values of vegetables and fruit	11
	- Vegetable and fruit consumption and health benefit as disease prevention	13
	- Guide line of vegetable and fruit consumption	17

Copyright by Mahidol University

CONTENTS (cont.)

CHAPTER

Part 2 Modification of principles and theories in program and other related researches

- Preschool child development 21
- Social Learning Theory 25
- Food experiencing for preschool child 29
- Relevant researches 37

III MATERIALS AND METHODS

Research Design 42
Population and Sample 43
Research Instruments 43
Research Procedures 49
Data Analysis 57

IV RESULTS 58

V DISCUSSION 75

VI CONCLUSION AND RECOMMENDATIONS 81

REFERENCES 84

APPENDIX

A. Ethic Consideration 94
B. Questionnaires and Observational Record Form 95
C. The Implementation Instrument 119
D. Additional Tables 133

BIOGRAPHY 138

Copyright by Mahidol University

LIST OF TABLES

Table		Page
1	Important nutrient of some vegetables such as dietary fiber, calcium , iron , vitamin A, and vitamin C.	19
2	Important nutrients of some fruits such as dietary fiber, calcium, iron, vitamin A, and vitamin C.	20
3	Number and percentage of the students by socio-demographic characteristics of the parents	60
4	Number and percentage of the students' characteristics	63
5	Number and percentage of the weight and height by sex of the students.	64
6	Number and percentage of the nutritional status of the students.	64
7	Comparison of mean kinds of vegetables and fruit eaten by the students before and after intervention	65
8	Comparison of mean of the kinds of vegetables and fruit consumption by gender before and after intervention	67
9	Comparison of the mean amounts (grams) of vegetable and fruit intake of the students before and after intervention	68
10	Comparison of the mean amounts (grams) of vegetables and fruit consumption by gender before and after intervention	69
11	Comparison of the mean scores of vegetable and fruit-eating behavior of the students before and after intervention	70
12	Comparison the mean scores of vegetable and fruit-eating behavior by gender before and after intervention	71
13	Lesson plans of 11 activities of the food experience program	119
14	Numbers and percentages of the vegetable and fruit consumption behaviors of the families	133

Copyright by Mahidol University

LIST OF TABLES (cont.)

Table		Page
15	Number and percentage of the family's food preparation for their child	134
16	Numbers and percentages of the parent's promoting behaviors on vegetable and fruit eating to students	135
17	Distribution of the mean amounts of each vegetable intake of the students	136
18	Distribution of the mean amounts of each fruit intake of the students	136
19	Distribution of the mean scores of each vegetable-eating behavior of the students	137
20	Distribution of the mean scores of each fruit-eating behavior of the students	137

Copyright by Mahidol University

LIST OF FIGURES

Figure		Page
1	Conceptual framework	8
2	Research Design diagram	42
3	Experimental Diagram	42

Copyright by Mahidol University

CHAPTER I
INTRODUCTION

Background

In an ideal nutrition-conscious world, the recommended diet for children will promote health, support growth, and prevent risk for disease among all (1). Dietary consumption plays an important role in health. Inappropriate eating behaviors bring the risk of chronic diseases such as heart disease, hypertension, obesity and cancer (2,3). Vegetables and fruits are emphasized as important foods for health or protective food because they contain the essential nutrients such as vitamins, minerals, and fiber, as well as are low in fat, sodium and calories compared to many other foods (4,5,6). Epidemiological evidence has shown significant relationships between high fruit and vegetable consumption and the prevention of major chronic diseases, heart disease and lowered risks for many types of cancer, particularly epithelial cancer of the digestive and respiratory tracts (7,8,9,10,11,12). Because of the importance of vegetables and fruit for promoting health and preventing disease, many countries have issued recommendations for increasing vegetable and fruit intakes in every age group (13). Several dietary guidelines and health promotion programs encourage fruit and vegetable consumption such as in America, The National Cancer Institute recommended that everyone should consumed five or more servings (400-800 g) of fruit and vegetables per day (14,15). The national objectives in Canada have been set at five or more servings of fruits and vegetables per day (16).

Similarly, Thai dietary guidelines (The Thai Nutrition Flag) also recommend people to take four to six servings of vegetables and three to four servings of fruit per day (17). However, it was found that actual vegetable and fruit consumption was lower than this recommendation. Data from the Thailand National Dietary Survey in 1995 revealed that Thai people consumed only 113.4 g of vegetables or approximately two servings and 73.6 g of fruit or approximately one to two servings per day. Measuring vegetable and fruit consumption in preschoolers aged 1-5 years it was found that they ate 24.3 g of vegetables (< 1 serving) and 86.3 g of fruit (~ one

Copyright by Mahidol University

serving) per day (18). In addition, a study on nutritional patterns and values of food consumption of 133 elementary school students aged 10-12 years (School in Bangkok, year 1995) found that students consumed only one serving of vegetables and less than one or only one serving of fruit (19). Recently a study of 369 adolescent children aged 12-18 years in Khon Kaen Province (Secondary school students 1-6, year 2001) found that students consumed 427.19 g of fruit per day, but only consumed 132.44 g of vegetables (~ 1-2 servings) per day (20).

From the data above, it is shown that vegetable and fruit consumption in every age group is lower than recommended and that Thai children also eat less than the recommended amounts of vegetables and fruits. Many research studies have provided clear evidence that food habits and patterns of nutrient intake acquired in early childhood "track" into later childhood and adulthood (21,22). Childhood eating patterns can have long-term health effects. Improving lifestyles and focusing on healthful food choices within the context of the total diet in early age has the potential for a major impact on the future of adult chronic diseases. Cardiovascular disease begins in childhood (23) even though heart disease generally does not become symptomatic until adulthood. Risk factors associated with coronary artery and hypertensive disease develop during childhood (24). As quoted from Berenson et al. (25), the central thrust (of nutrition guidelines) should be to help young generations grow up with healthful habits from the beginning, liberated from the harm of adverse lifestyles.

Behaviors are more easily changed or prevented when they are still being formed in childhood rather than adulthood (26,27). Some researchers believe that food preferences and dietary habits are established during the early years of life, and dietary patterns that are formed during childhood persist throughout adolescence (28) and into adulthood. Foods disliked in early childhood are incorporated into personal food systems and often remain unsought, unacceptable, or uneaten (29). The preschool child is at the beginning age to form definite responses to various types of food. Fruits are usually well-liked. In contrast, most children do not prefer the taste of vegetables. It is well known that food preferences are especially important determinants in the food intake of young children (30,31,32,33,34,35). The preschoolers usually choose to eat foods they like (36,37,38,39,40,41,42), almost all do not like to eat vegetables

Copyright by Mahidol University

(37,42). In a previous study, many people reported that they have disliked vegetables since they were children (29). Thus, childhood represents an ideal time to intervene for improving dietary behaviors and encourage positive vegetable and fruit-eating habits particularly, dietary interventions to prevent obesity and chronic diseases should be targeted at children.

The child begins to have opportunities to make food selections from among all sorts of choices during the early years and beyond. If habits of choosing nutritious foods are developed early, the chances of sustaining those habits later are much greater. It is important to realize, however, that children's food preferences are learned through repeated exposure to foods (43). Food preferences are learned via experience with food and eating (44). Food experiences can have long-term manifest and latent influences on food choices. Food experience in preschool child can be opportunities to learn about the benefits and importance of food from direct experience. Many researchers have reported on food experience. Mack (45) stated that one importance of food experience is to acquaint children with food variety and to encourage them to accept new foods as well as to broaden the child's understanding of the relationship between diet and good health. Feeney (46) mentioned that food experience for kindergarteners help them to develop learning, acceptance, and fun with the taste of new foods, help them to develop confidence with the feeling of success, and can be used as a medium for teaching nutrition. Mayesky (cited in 47) stated that foods are a part of each child's experience. Foods and cooking are interesting to children. All of their senses are used in food activities. They see the foods, smell them, touch them, and taste them. Hilderbrand (48) supported this stating that food and cooking experiences provided within the curriculum should be encouraged because of the children's high interest level. They enjoy helping with food preparation, eating foods, and talking about food. In addition, Beaty (49) found that children learn very quickly what foods we consider important, not by what we say but by observing the kinds of food we serve in the classroom. If we want children to become acquainted more with delicious fruit and interesting vegetables, plan some exciting food activities with these foods as well.

Furthermore, food acceptance and the development of food choice patterns are multifactorial and complex processes. The adequacy of children's food intake and,

Copyright by Mahidol University

consequently, their nutrient intake depends not only on the foods available to them but also on cultural, environmental, interactional, and societal factors (50). Food experiences and environmental factors work together to form attitudes about eating fruit and vegetables. Hilderbrand (48) suggested that the choice of food often depends on social or peer pressure and practice as well as on rational nutritional information. Swadener (51) reported research results that found that food acceptance was also enhanced when the food was offered in a positive social context; for example, with positive attention by preschool teachers. The Social Learning Theory was applied to be a foundation for designing interventions. It has been useful in the design of dietary change programs because it has strong empirical support and provides a basis for understanding how complex characteristics interact. (cited in 52) The Social Learning Theory concept of reciprocal determinism posits that the environment, an individual's behavior, and an individual's personal characteristics continuously affect one another (53).

These cited concepts and reasons show that food experiences are important and useful to develop eating behaviors in young children. Therefore, the researcher applied these concepts as a guideline on promoting vegetable and fruit consumption among kindergarten students by food experiences. In addition, the researcher incorporated the Social Learning Theory to emphasize a variety of activities and a symbolic model relating to vegetable and fruit consumption and conforming to child development including preparing food with vegetables and fruit for children at lunch.

Copyright by Mahidol University

Research Question

Would the food experience program effect changes in vegetable and fruit consumption among kindergarten children?

Research Objectives

General Objective

The purpose of this research was to study the effectiveness of the food experience program on promoting vegetable and fruit consumption among kindergarten children.

Specific Objectives

To evaluate the effectiveness of the food experience program on promoting vegetable and fruit consumption among kindergarten children that would affect vegetable and fruit consumption in the following aspects:

1. The kinds of vegetable and fruit intake
2. The amounts of vegetable and fruit intake
3. The scores of vegetable and fruit-eating behavior

Research Hypothesis

This intervention was conducted to test the hypothesis as follows:

1. The kinds of vegetable and fruit intake of kindergarten students would increase after intervention.

2. The amounts of vegetable and fruit intake of kindergarten students would increase after intervention.

3. The scores of vegetable and fruit eating behavior of kindergarten students would increase after intervention.

Research variables

An independent variable was the food experience program on promoting vegetable and fruit consumption among kindergarten children.

Copyright by Mahidol University

Dependent variables were the vegetable and fruit consumption that consisted of the kinds, the amounts of vegetable and fruit intake, and the scores of vegetable and fruit eating behavior.

Scope of the Study

This study focused on the effectiveness of the food experience program on promoting vegetable and fruit consumption among kindergarten students 4-5 years old who were studying in the first year of kindergarten, Sukhothai School, Bangkok Metropolitan area. The period of intervention was 8 weeks in the first semester, from July to September, 2003.

Limitation of the Study

1. The selected subjects were kindergarten students from Sukhothai School, an institute with complete facilities and a school policy promoting vegetable and fruit consumption.

2. This study was a quasi-experimental study with one group pretest-post-test design because the samples were young children and the method of evaluation program was direct lunch observation. Because the study was one group experimental design, so the results could not define the effects of confounding factors.

3. This study featured a small convenience sample that might not be representative of the general population of the children who were kindergarten students.

4. On the basis of this study, the researcher would promote increased consumption of fresh fruit and dark green leafy and deep yellow vegetables among children in our sample. Therefore, the kinds of vegetables and fruits in preparing the menu for evaluation of the program consisted of five kinds of vegetables (Chinese kale, Chinese white cabbage, Ivy gourd, Chinese cabbage, and pumpkin) which were dark green leafy and deep yellow vegetables and easy to cook and five kinds of fruits (rambutan, guava, ripe papaya, pineapple, and banana) which were seasonable fruits, nutritious and easy for children to eat.

Copyright by Mahidol University

Definition of Terms

Food experience program refers to the operational plan that provides food experience activities for persuading children to eat vegetables and fruit by using principles, methods, and media according to the Social Learning Theory. The program consisted of 11 activities which provided knowledge of vegetable and fruit-eating benefits and created acquaintance and acceptance of vegetables and fruit.

Vegetable and fruit consumption refers to vegetable and fruit eating behaviors of the students from direct lunch observation at school that consisted of the kinds of fruit and vegetables, the amounts of vegetable and fruit intake, and the scores of vegetable and fruit-eating behavior.

Kinds of vegetable and fruit intake refers to the five kinds of vegetables (Chinese kale, Chinese white cabbage, Ivy gourd, Chinese cabbage, and pumpkin) and fruits (rambutan, guava, ripe papaya, pineapple, and banana) eaten by the students that were directly observed at lunch during five days (5 menu) before and after intervention.

Amounts of vegetable and fruit intake refers to the average amounts of five kinds of vegetables (Chinese kale, Chinese white cabbage, Ivy gourd, Chinese cabbage, and pumpkin) and fruits (rambutan, guava, ripe papaya, pineapple, and banana) eaten by the students that were directly observed at lunch during five days (5 menu) before and after intervention.

Scores of vegetable and fruit eating behavior refers to the average scores of vegetables (Chinese kale, Chinese white cabbage, Ivy gourd, Chinese cabbage, and pumpkin) and fruit (rambutan, guava, ripe papaya, pineapple, and banana) eating behaviors that were recorded from direct observation when the students ate lunch during five days (five menus) before and after intervention.

Kindergarten children refers to the students, 4-5 years old, who were studying in the first year of kindergarten in the first semester, academic year 2003, Sukhothai School, Bangkok Metropolitan area.

Copyright by Mahidol University

Summary of conceptual framework

Independent variable

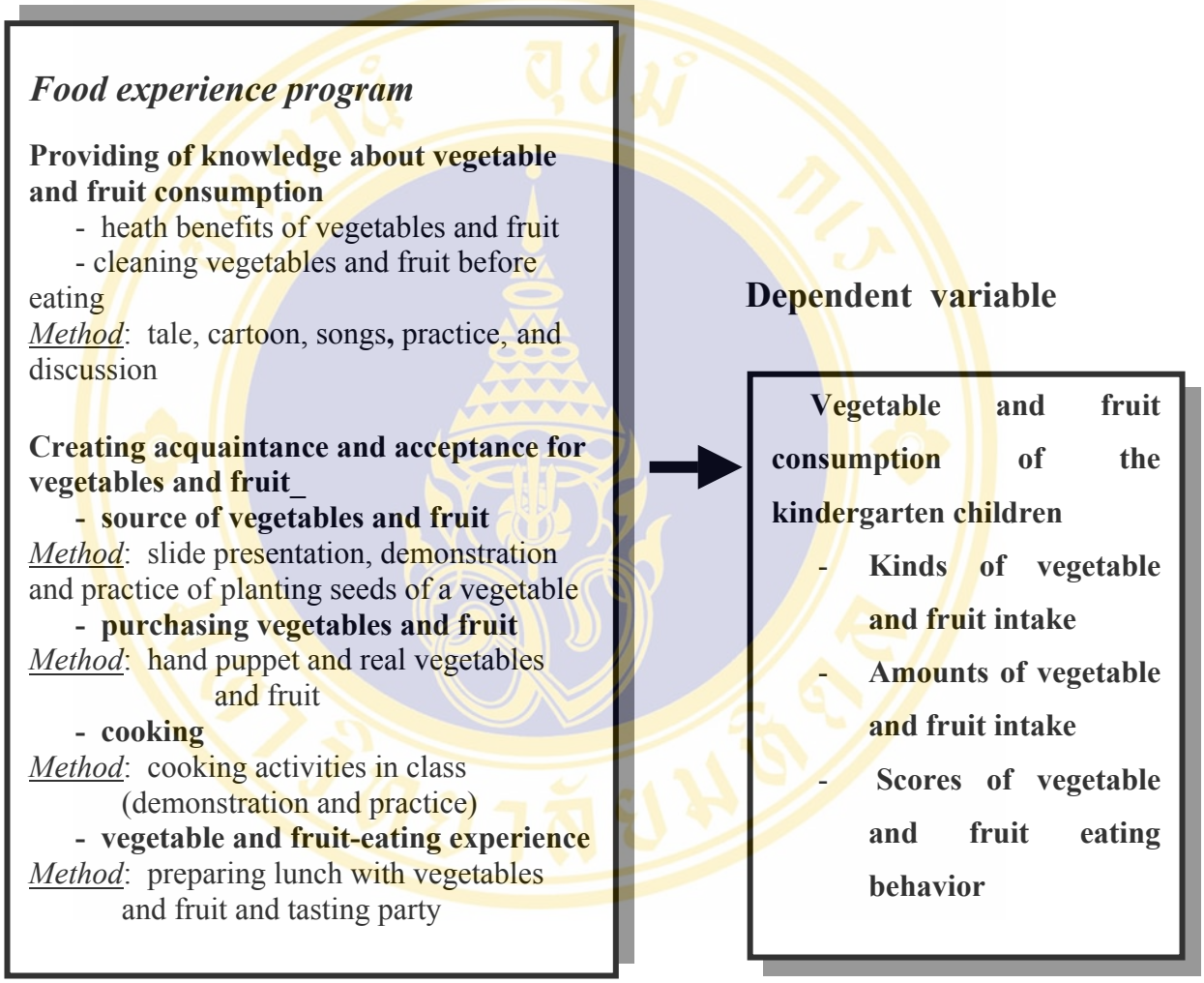


Figure 1 Conceptual Framework

Copyright by Mahidol University

CHAPTER II
LITERATURE REVIEWS

This study was to assess the effectiveness of food experience program on promoting vegetable and fruit consumption among kindergarten children that focused on their vegetable and fruit eating behaviors. Then review literature consisted of two major parts as follow:

Part 1 The importance of vegetable and fruit consumption

1.1 Knowledge about vegetables and fruit

1.2 Components and nutritional values of vegetables and fruit

1.3 Vegetable and fruit consumption and health benefit as disease prevention

1.4 Guide line of vegetable and fruit consumption

Part 2 Modification of principles and theories in program and other related researches

2.1 Preschool child development

2.2 Social Learning Theory

2.3 Food experiencing for preschool child

2.4 Relevant researches

Copyright by Mahidol University

Part 1 The importance of vegetable and fruit consumption

1.1 Knowledge about vegetables and fruits

Definition (54)

Plant foods are usually divided into seeds (including cereals), nuts and a third combined group of fruits and vegetables.

Vegetables

In academic classification, vegetables are grouped into three major categories: (55)

Vegetables we eat leaves, flowers (including banana flower) such as morning glory, chinese kale, chinese cabbage, lettuce, ivy gourd, cauliflower, mushroom.

Vegetables we eat pods such as radish (beetroot), onion, green pea (French bean), gardenpea (Holland bean), pumpkin, gourd, cucumber.

Vegetables we eat bulbs (or tubers), roots such as sweet potato, taro and potato, these contain in high carbohydrate, in nutritional, they are classified as the second group (in the five major food groups).

Fruits

Fruits are the fleshy seed-bearing parts of plants. However, through popular usage some fruits such as tomato and cucumber are classed as vegetables. So the group includes a large number of very diverse foods which differ considerably in nutritional value (54).

For Thai people, fruits are classified as the fourth group in the five major (basic) food groups. Fruits contain alike vegetables in minerals and vitamins, then they are defined as protective foods. Furthermore, fruits contain fiber that helps in defecation.

In USA, vegetables and fruits are combined in same group, but Thai eating patterns do not like Western because Thai eat vegetables as main dish with meat (mealtime dishes) and eat fruits as desserts (55).

Botanically, a fruit is any seed-containing part of the plant. Fruits include apples, apricots, blueberries, cherries, cranberries, figs, grapefruits, grapes, kiwi fruits,

Copyright by Mahidol University

lemons, limes, mangoes, melons, nectarines, oranges, papayas, peaches, pears, pineapples, plums, raspberries and strawberries. Citrus fruits include oranges, grapefruits, lemons and limes. A few fruits are sometimes consumed in dried form, these include grapes, apricots, plums, apples, dates and figs (56).

Botanical fruits such as olives, avocados and coconut have generally not been included in vegetable and fruit categories, either because of their high fat content or infrequent consumption in a given population (56).

1.2 Components and nutritional values of vegetables and fruits

Vegetables and fruits are relatively rich in vitamins, minerals, and other bioactive compounds compared with other food groups. Although different types have different nutrient profiles, they are, generally, low in energy and are good sources of non-starch polysaccharides (fiber), and of carotenoids, vitamin C, folate, potassium and other vitamins, minerals, and bioactive microconstituents (56)

In addition to the phytochemicals, fruits and vegetables are naturally low in fat, saturated fat, cholesterol, calories, and sodium and are rich in potassium, fiber, folic acid, and vitamin C (57). Vegetables rich in fiber, phytochemicals, and the antioxidant nutrients (beta-carotene and vitamin C) can protect against chronic diseases (58). Fruit is especially known as a source of ascorbic acid, although tropical fruits are a better source than the similar products grown in temperate regions. (59).

Excellent sources of beta-carotene include dark green, yellow, and orange vegetables and fruits such as broccoli, cantaloupe, carrots. Good sources include cabbage, tomatoes, and water melon (60). Sources of vitamin C include citrus fruits, berries, tomatoes, broccoli, cabbage, melons, cauliflower (60). Generally, the more color a fruit (or vegetable) has, the more vitamins and minerals it contains.

Naturally, most fruits supply several essential nutrients, particularly, they contain a very high proportion of water (e.g. up to 92% in watermelons). Other kinds of fruits, generally, contain proportion of water 80-90%, and even 25% in dried mass of fruits (61). Fruit is a moderate to poor source of the members of the vitamin

Copyright by Mahidol University

B group. Plums and tomatoes are a good source of niacin and strawberies , oranges and grapefruit have significant amounts of folate. Vitamin B12 is the only vitamin in the B group that is not found in fruits.

Citrus fruits such as oranges and grapefruit and other fruits such as guava, strawberries and papaya supply vitamin C (61) and /or A. Dried fruits are concentrated sources of energy, sugar, dietary fiber and iron (56). Fruit sources of iron are dried fruits such as prunes and raisins (55,61).

Vitamin C is essential for immediate good health (62). Vitamin C is also a good example of a compound which has more than one function. It is an important antioxidant, protecting cells from oxidative damage and reducing the risk of cancer and cardiovascular disease. It has a role in the regeneration of the oxidized form of vitamin E and in enhancing the absorption of iron. Vitamin C is needed for healthy gums, teeth and bones and it helps to speed up wound healing. Deficiency leads to scurvy. With a few exceptions, animals can synthesizes vitamin C from d-glucose but primates, including humans, cannot and we must get vitamin C from dietary sources. Vitamin C may have a role in the prevention of cataract, probably through its antioxidative mechanism. Vitamin C, which includes ascorbic acid and dehydroascorbic acid, functions as a general antioxidant and a component of several enzymatic reactions in intermediary metabolism. Some provocative evidence concerns the ability of vitamin C to inhibit formation of carcinogenic nitrosamines, which ultimately may reduce incidence of cancers that are thought to be associated with nitrosamines, such as gastric cancer. At present, there is no evidence to suggest that consumption of vitamin C supplements at levels higher than can be achieved in a well-balanced diet containing ample fresh fruits and vegetables is useful for prevention or treatment of cancer in human.

Carotinoids are the pigments found in yellow-orange, red, and green vegetables and the yellow-orange fruits. **β-Carotene** is the major vitamin A precursor in plants. The carotinoids are powerful antioxidants that act to quench free radicals, protect against oxidative damage, and stimulate immune function. Persons with high levels of serum carotinoids have low risk of heart disease and cancer (63,64).

Copyright by Mahidol University

Folate is essential for the normal metabolism of amino acids, methyl groups, and nucleotides. Folate plays a role in the methylation of DNA, which may be critical for the normal regulation of gene expression and tissue differentiation. Evidence from epidemiological and laboratory studies evidence suggest that insufficient folate may relate to the risk of several malignancies, particularly colon cancer. Folate primarily is derived from fruits and vegetables and may be one component of risk reduction of cancer.

1.3 Vegetable and fruit consumption and health benefits as disease prevention

Vegetables and fruits contain an abundance of phenolic compounds, terpennoids, pigments, and other natural antioxidants (including vitamins A, C, and E) that have been associated with protection from and/or treatment of chronic diseases such as heart disease, cancer, diabetes, and hypertension as well as other medical condition (65).

The recommendation for consumption of plant foods regularly is strongly supported by substantial epidemiologic evidence which show that eating vegetables and fruits can decrease risk of cancer (66). Many case-control study and prospective studies have provided further evidence that high consumption of plant food confers numerous health benefits. Investigations support linkages between increased vegetable, fruit and fiber consumptions and lower rates of several cancers, coronary heart disease (CHD). Although the mechanisms are not fully understood, carotenoids, folic acid, and fiber appear to play important roles in prevention of these diseases (66).

Higher intake of fruits and vegetables has been associated with lower rate of cancers (e.g., lung, breast, prostate, colon, esophageal, bladder, stomach), cardiovascular diseases, stroke, Type 2 diabetes, obesity, and other multiple diseases (56). Fruits and vegetables contribute to cardiovascular health through the variety of phytonutrients, potassium and fiber. Daily intake of fresh fruits and vegetables, in an adequate quantity (400-500 g per day), is recommended for reducing the risk of coronary heart disease, stroke and high blood pressure (67).

Vitamin C (ascorbic acid), vitamin E, and vitamin A, are antioxidants that limit the extent of free radical - mediated oxidative reactions. They prevent lipid

Copyright by Mahidol University

peroxidation, and they may have antimutagenic properties. High dose of these vitamins may provide protection from atherosclerosis (presumably by inhibiting the oxidation of LDL) and possibly from cancer (by preventing somatic mutations).

There is good evidence that high vegetable and fruit consumption can protect against a number of diseases other than cancer. Carotenoids, vitamin C and perhaps other antioxidants protect against cataracts. They also decrease the oxidation of cholesterol in the arteries and thus protect against cardiovascular disease. Vitamin C may help maximize iron absorption in intestine and thus decreasing iron-deficiency anaemia. In some developing countries, where food is scarce or diets are monotonous, inclusion of small amounts of vegetables and fruits containing β-carotene and vitamin C can prevent xerophthalmia and scurvy (56).

Many vegetables and fruits contain NSP/fiber, and most contain high potassium. NSP/fiber may can control diabetes and high serum cholesterol levels, and protects against diverticular disease and other digestion disoders. Potassium may prevent or control hypertension and thereby reduce the subsequent risk of stroke and heart disease (56).

Vegetables and fruits as obesity prevention

In more affluent countries, high prevalence of obesity is not only found in the middle-aged, but also among younger adults and children (67).

Obesity is a major risk factor for coronary heart disease, hypertension, type 2 diabetes, and lipid abnormalities (68). Treatment approaches for obesity management include lifestyle interventions, such as eating a healthy diet and increasing physical activity (69). As part of the nutritional approach, fruits and vegetable play an integral role because of their low fat , low energy. Unadorned fruits and vegetable represent a food group which can be consumed in relative abundance even during a weight-loss phase of weight management. Vegetables and fruits contain fiber that make consumers full feel fully after eating. Vegetables and fruits contain very little fat, and low in calories. (Durians are one exception, and dried fruits increase the energy content). High vegetable and fruit diets protect against obesity, against the risk of cardiovascular disease, as well as against those cancers associated with overweight and obesity (56).

Copyright by Mahidol University

Vegetables and fruits as constipation prevention (62)

Common causes of constipation are consumption of low fiber diet, drinking less liquids, lack of exercise, medications, irritable bowel syndrome and etc. The most common cause of constipation is eating low fiber which found in vegetables, fruits, and whole grains but eating high fats which found in cheese, eggs and meats. People who eat plenty of high-fiber foods are less likely to become constipated. Fiber – both soluble and insoluble is the part of fruits, vegetable and grains that the body cannot digest. Soluble fiber dissolves easily in water and takes on a soft, gel-like texture in the intestines. Insoluble fiber passes through the intestines almost unchanged. The bulk and soft texture of fiber prevent hard and dry stools and the stool can easily pass though intestine and rectum.

According to the National Center for Health Statistics, Americans eat an average of 5 to 14 grams of fiber daily which need more 20 to 35 grams according to the recommendation by the American Dietetic Association. Both children and adults eat too many refined and processed foods which the natural fiber are less than fresh foods.

Vegetables and fruits as heart disease (CVD) prevention

Antioxidants from fruits may also help to protect against heart disease. Cardiovascular disease (CVD) occur when blocked arteries restrict blood supply to the heart muscle. The most common cause of blockage is the development of complex altheromatous plaques, composed of inflamed tissues and fatty deposits on the inner surface of the artery. These plaques develop slowly over time and may cause chronic restriction of blood flow leading to pain on exertion (angina) or acute blockage. This most often occurs when the irregular , inflamed surface of the plaque leads to formation of a blood clot. When this occurs a region of heart muscle is suddenly deprived of blood and the muscle is damaged. This is called a heart attack. High serum lipid levels, associated with high intakes of saturated fat or cholesterol, is a cause of heart disease. The accumulation of cholesterol as deposits within atheromateous plaques may be accelerated by

Copyright by Mahidol University

oxidative damage to the low density lipoproteins(LDL). Such damage might be prevented by high intakes of antioxidants (62).

In addition, because of abundant fiber of vegetables and fruits affect to lipid absorption at intestines by inhibiting lipid enzyme function which can reduce lipid absorption and excrete some of lipid. Reducing the amount of saturated fat but increasing fiber consumption affect changing in serum lipid levels (70).

Vegetables and fruits as cancer disease prevention

Between 2000 and 2020, the total number of case of cancer in the developing world is predicted to be increased by 73% and, in the developed world, to be increased by 29%, largely as a result of an increasing in the number of aging (67).

People who eat greater amounts of fruits and vegetables can reduce risk of cancer and less mortality from cancer (71). Fruits and vegetables are most effective against those cancer that involve epithelial cells, such as cancer of the lung, cervix, esophagus, stomach, colon, and pancreas (71).

Potentially anticarcinogenic agents found in fruit and vegetable include; carotenoids, vitamins C and E, dietary fiber, selenium, glucosinolates and indoles, isothiocyyanates, flavonoids, phenols, protease inhibitors and plant sterols, so called phytochemical.

Fruits and vegetables, as well as other plant foods, contain phytochemical, minute plant compounds that fight against cancer formation. For instance, broccoli contains the chemical sulforaphane, which seems to initiate increased production of cancer-fighting enzymes in the cells. Vegetables of the cabbage family (cabbage, broccoli, cauliflower, mustard greens, kale), also called cruciferous vegetables, contain phytochemicals such as indoles and dithiolthiones. They activate enzymes that destroy carcinogens (60). Cruciferous vegetables contain nutrients and phytochemicals that may inhibit cancer development (58).

Fiber, fruits and vegetables reduce cancer risk (60). The fiber in fruits and vegetables may help to protect against some cancers by speeding up the transit time of all materials through the colon so that the colon walls are not exposed to cancer-

Copyright by Mahidol University

causing substances for long. Many studies strongly support the premise that fiber-rich diets protect against some forms of cancer, including colon cancer (58).

1.4 Guide line of vegetables and fruits consumption

Recommendation of consumption

Many countries develop a public health framework, with targets for the reduction of heart disease and other chronic disease. These frameworks often had a subset of nutrient or food goals which were either derived from the nutrient standards for the country concerned. Dietary Guidelines in Western countries were concerned about avoiding obesity, reducing fat consumption, and increasing starch, fiber, and fruit and vegetable consumption (72).

Because fruit and vegetables have considerable potential as a source of nutrients, there are several recommendations of fruit and vegetable consumption such as The World Health Organization (WHO) study group on diet, nutrition and prevention of communicable diseases recommended daily consumption of at least 400 g (14 oz) of fruit and vegetables (73). In Western countries of Europe suggest up five to nine servings (at least 375 g per day) (54) same as The US Department of agriculture Food Guide Pyramid recommends that adults consume 5 to 9 servings a day of fruits and vegetables (73,4). Thai Nutrition Flag recommends consumption of fruit 3-4 servings and vegetables 4-6 servings per day (17).

Food Guide Pyramid (for vegetables and fruits) for young children (A Daily Guide for 2 to 6-year-olds) (58) is as follows:

Vegetable group	3	servings*
Fruit group	2	servings**

* ½ cup chopped raw or cooked vegetables, or 1 cup raw leafy vegetables counts as one serving.

** 1 piece of fruit or melon wedge counts as one serving.

Source: USDA Center for Nutrition and Policy Promotion, March 1999, Program AID 1649.

Copyright by Mahidol University

In the US, recommended amounts of vegetable and fruit group for an entire day for preschool children (suitable for children under age six) adapted by Nutrition Section, Division of Health, Louisiana Health and Human Resources Administration (45) are listed as follows

Food Group	**Servings**	**Size of Serving**
Milk	3	½-1 cup
Meat or Meat Alternate	2	2-4 Tablespoons
Fruits and Vegetables	4	¼-½ cup
Bread and Cereals	4	½ slice or ¼ cup

Four serving of fruits and vegetables are recommended each day for children. Approximately one-fourth to one-half cup of vegetables and fruits constitute a serving for a young child. The variety of foods available in this group makes it easy to satisfy the various taste preferences of children. Also, most fruits and vegetables may served either cooked or uncooked.

In Thailand, because of the recommended vegetable and fruit consumptions for preschool children aged 4-5 years are not specified, but recommendation for this vicinal ages are 1-3-year-old and 6-year-old. Recommended amounts of vegetable and fruit servings for a day for children 1-3-year-old of Nutrition Section, Ministry of Public Health (74) are following:

Food Group	**Servings**	**Size of Serving**
Vegetables	1	1-2 rice serving spoons (1 rice serving spoon ~ 40 g)
Fruits	1	1 small fruit / 1 slice (big fruit)

Recommended amounts of vegetable and fruit servings for a day for children 6-year-old of Nutrition Section, Ministry of Public Health (17) are following:

Food Group	**Servings**	**Size of Serving**
Vegetables	2	4 rice serving spoons (1 rice serving spoon ~ 40 g)
Fruits	3	3 small fruit / 3 slices (big fruit)

Copyright by Mahidol University

Consequently, recommended amounts of vegetable and fruit servings for a day for kindergarten children 4-5-year-old should be as follow:

Recommended Food Servings. (Adapted for preschool children 4-5-year-old)

Food Group	**Servings**	**Size of Serving**
Vegetables	1-2	2-4 rice serving spoons (1 rice serving spoon ~ 40 g)
Fruit	2-3	2-3 small fruit / 2-3 slice (big fruit)

In the Food Recipe for preschool children 3-6-year-old from Nutrition Section, Division of health, Ministry of Public Health, vegetables which are suitable for children such as tomatoes, pumpkins, ivy gourd leaves, Chinese white cabbage swamp morning glory, radish, yard long bean (green), cucumber, carrot, angled gourd, wax gourd, Chinese cabbage, corn (whole kernel, baby), Chinese kale, and fruits that should be prepared for them such as water melon, papaya (ripe), tangerine, rose apple, rambutan, banana, pineapple, guava (74). These vegetables and fruits, the nutrition value content are shown in table 1 and table 2 (75).

Table 1 Important nutrient of some vegetables such as dietary fiber, calcium , iron , vitamin A, and vitamin C.

Food and description	**Nutrient composition per 100g edible portion**					
	Diet.fiber (gms)	Calcium (mgs)	Iron (mgs)	Beta Carotene (microgms)	Total Vit.A (RE) (microgms)	Vit.C (mgs)
Tomato	1.1	2	4.9	373	62	32
Pumpkin, without skin	1.0	7	1.9	-	310	84
Ivy gourd, leaves	1.0	126	4.6	5190	865	34
Chinese white cabbage	0.5	7	0.4	11	2	52
Swamp morning glory, white	1.1	3	3.0	1151	192	16
Radish	1.7	34	0.2	-	-	21

Copyright by Mahidol University

Table 1 Important nutrients of some vegetables such as dietary fiber, calcium, iron, vitamin A, and vitamin C. (continued)

Food and description	Nutrient composition per 100 g edible portion					
	Diet.fiber (gms)	Calcium (mgs)	Iron (mgs)	Beta Carotene (microgms)	Total Vit.A (RE) (microgms)	Vit.C (mgs)
Yard long bean, green	1.9	43	-	682	113	12
Cucumber	0.7	5	0.4	40	7	20
Carrot	1.0	1	1.2	6994	1166	3
Angled gourd	0.3	5	0.7	30	5	15
Waxgourd	0.5	8	0.3	-	25	69
Chinese cabbage	1.6	11	1.6	1808	301	25
Corn, whole kernel, baby	2.1	4	0.5	12	2	23
Chinese kale	1.6	245	1.2	2512	419	147

Table 2 Important nutrients of some fruits such as dietary fiber, calcium, iron, vitamin A, and vitamin C.

Food and description	Nutrient composition per 100 g edible portion					
	Diet.fiber (gms)	Calcium (mgs)	Iron (mgs)	Beta Carotene (microgms)	Total Vit.A (RE) (microgms)	Vit.C (mgs)
Water melon	0.3	3	0.2	122	20	49
Papaya, ripe	0.5	12	2.5	-	435	78
Tangerine (Mandarin)	1.3	30	0.8	82	13	42
Rambutan	1.1	3	1.8	-	tr.	31
Banana,Kai variety	1.9	4	1.0	492	82	2

Copyright by Mahidol University

Table 2 Important nutrients of some fruits such as dietary fiber, calcium, iron, vitamin A, and vitamin C. (continued)

Food and description	Nutrient composition per 100 g edible portion					
	Diet.fiber (gms)	Calcium (mgs)	Iron (mgs)	Beta Carotene (microgms)	Total Vit.A (RE) (microgms)	Vit.C (mgs)
Pineapple	1.2	11	0.2	11	2	7
Guava	29	2	0.4	21	3	187

* Source : Thai Food Composition Tables 1999 (Nutrition Section, Division of health)

In this study, the researcher would promote increased consumption of fresh fruit and dark green leafy and deep yellow vegetables among children in our sample. Therefore, the kinds of vegetables and fruits in preparing the menu for evaluation of the program consisted of five kinds of vegetables (Chinese kale, Chinese white cabbage, Ivy gourd, Chinese cabbage, and pumpkin) which were dark green leafy and deep yellow vegetables and easy to cook and five kinds of fruits (rambutan, guava, ripe papaya, pineapple, and banana) which were seasonable fruits, nutritious and easy for children to eat.

Part 2 Modification of principles and theories in program and other related researches

2.1 Preschool child development

Physical and Motor development

A noticeable difference between preschoolers and their infant and toddler counterparts that preschoolers have lost most of their baby fat and taken on a leaner, lankier look. This “slimming down” enables the preschooler to participate with more

Copyright by Mahidol University

confidence in the loco motor activities so vitally necessary during this stage of growth and development. Both girls and boys continue to grow several inches per year throughout the preschool years. At age three, the average boy weighs about 32 pounds and the average girl is about a pound and a half lighter (76).

Preschool children are in an age of motor skill development. They learn to use and test their bodies. It is a time for learning what they can do and how they can do it as individuals. Locomotion plays a large role in motor and skill development and includes activities of moving the body through space–walking, running, hopping, jumping, rolling, dancing, climbing, and leaping. Children use these activities to investigate and explore the relationships between themselves, space, and objects in space. Preschoolers demonstrate the principles of cephalo-caudal and proximo-distal development. The cephalo-caudal development enables the preschooler to participate in many physical activities; likewise, the concentration of motor development in the small muscles of the arms and hands enables them to participate in fine motor activities of drawing, color, painting, cutting, and pasting. Consequently, preschoolers need programs that provide action, activity, and play, supported by proper nutrition and healthy habits of plentiful rest and good hygiene (76).

Good education practices also dictate that a preschool curriculum de-emphasize activities that require preschoolers to wait or sit for extended periods of time. Although self-control is part of preschooler' socialization process, developmentally appropriate practices and activities must be introduced for them. It is also important to incorporate health education into programs for four- and five-year-olds children. Children should receive information about hygiene and nutrition; because bad habits are almost impossible to be changed in elder age, therefore, preschool and elementary curricula should incorporate lifelong goals and objectives for healthy living (76).

Cognitive Development

Preschoolers are in the preoperational stage of intelligence. These are characteristics of the preoperational stage:

1. children grow in their ability to use symbols, including language
2. children are not capable of operational thinking

Copyright by Mahidol University

3. children center on one thought or idea, often to the exclusion of other thoughts

4. children are unable to conserve

5. children are egocentric

Characteristics during the preoperational stage have particular implications for teachers. Because the preschool child is egocentric, he believes everyone sees what he sees and thinks as he thinks. This egocentrism influences how he responds to things and how he interacts with others. Piaget believed the underlying reason for many of the preoperational child's "errors" of reasoning stemmed from his inability to see viewpoints other than his own. This egocentrism is not selfishness, but, rather, a lock of awareness. Early childhood educators recognize that many children are able to engage in cognitive activities earlier than Piaget thought and that many do not demonstrate a characteristic at the age or to the degree Piaget maintained. For example, Piaget believed that young children are animistic, that is, they attribute life to nonliving objects; preoperational children are animistic, but not to the extent Piaget thought they were. Preschool teachers, therefore, need an understanding of developmental theories that will enable them to match activities to children's cognitive needs and stages (76).

Language Development

The preschool years are a period of rapid language development. Vocabulary increases, and as children continue to master syntax and grammar, sentence length increases. The first words infants or toddlers use are holophrases, one word that conveys the meaning of a sentence (76).

During the preschool ages, children's language development is diverse, comprehensive, and constitutes a truly impressive range of learning. A more impressive feature of language acquisition during the preschool years is that children learn intuitively, without a great deal of instruction, the rules of language that apply to words, phrases, and the utterances they use (76).

Copyright by Mahidol University

Psychosocial Development

During the preschool years, children are in the initiative vs. guilt stage of development. They need initiative activities, and teachers should respond to this need by providing opportunities whereby children can undertake activities that will help them develop a feeling of mastery over themselves and their environment. During this stage, caretakers should avoid harsh criticism and restrictive caregiving and teaching styles. In particular, over protectiveness promotes hesitancy and fearfulness, which counteract and inhibit children's efforts to initiate (76).

During the preschool years, children are capable of initiating the majority of their actions and need this initiative to become independent and confident decision makers. Of course, a great deal of risk-taking is involved in this process. Caretakers can support children's initiative and decisions with positive reinforcement. Children can also be encouraged to take risks within a safe environment with limited freedom. This is why an "open" classroom and "free play" activities provide the appropriate environmental support at this stage (76).

Young children think in very literal terms. Then, as they develop in mental capacity, they can handle more than single ideas and form constructive concepts (77). The core psychosocial developmental struggle is the conflict of thought between initiative versus guilt. They begin to develop the superego—the conscience. As powers of active movement increase, their increase also imagination and curiosity. The excessive capacity often leads them into conflict feelings about their changing attitudes, especially toward their parents. This is a period of increasing imitation and sex identification. The little boy imitates his father or other male role models. The little girl imitates the mother or other female role models. Their activities can be observed by their role play such as, using of grown-up clothes and role-playing in domestic or job situations. Self-feeding skills increase by age and eating behaviors involve with greater social aspects. The family mealtime is an important means of socialization and sex identification, as the children imitate their parents and others at the table (77)

Copyright by Mahidol University

2.2 The Social Learning Theory

Social learning theory concerns the learning that occurs within a social context. It focuses on how people learn from one another and encompasses such concepts as observation, imitation, and modeling.

Principles of Social Learning Theory (78)

A number of general principles underlie social learning theory:

People can learn by observing the behaviors of others and the outcomes of those behaviors. Many behaviorists considered that learning largely was a matter of trial and error: People learn by engaging in different behaviors and then modifying them based on the consequences (i.e., reinforcement and punishment) that those behaviors brought. In contrast, social learning theorists propose that most learning take place not through trial and error, but instead through watching the behavior of other individuals (models).

Learning can occur without a change in behavior. Behaviorists define learning as a relatively permanent change in behavior due to experience; thus, no learning can occur without a behavior change. In contrast, social learning theorists argue that because people can learn through observation alone, their learning will not necessarily be reflected in their performance. In other words, learning may or may not result in a behavior change. Someone learned anything at one time might reflect in changes in behaviors immediately, at a later time, or never change.

Reinforcement plays a role in learning. The role of reinforcement in social learning theory has evolved as the theory. In Miller and Dollard's (cited in 78) early theoretical analysis of learning new behaviors through imitation, reinforcement of those behaviors was a critical factor. Operant conditioning continued to be a major component of Albert Bandura's early work as well. More recently, however, the role of reinforcement has been reconceptualized. Contemporary social learning theorists propose that reinforcement has less critical, indirect, effects on learning—effects that we shall examine shortly.

Cognitive processes play a role in learning. Within the past 20 years, social learning theory has become increasingly "cognitive" in it analysis of human learning. For example, contemporary social learning theorists such as Bandura maintain that an individual's awareness of response-reinforcement contingencies is and essential

Copyright by Mahidol University

component of the learning process. They also assert that expectations of future rewards—incentives—can have a major impact on the behaviors that people exhibit. Finally, social learning theorists incorporate such cognitive processes as attention and retention (memory) into their explanations of how learning occurs.

Observational Learning

Observational learning allows on to develop an idea of how a new behavior is formed without actually performing the behavior oneself. It is governed by four processes: attention span, retention process, motor reproduction process, and motivation process. Attention refers to one's ability to select observation on the action of a model. For their part, observed behaviors can be reproduced only if those behaviors are retained in memory, a process that made human learn to behave. Behavior imitation refers to the process of engaging in the observed behavior. Finally, if engaging in the observed behavior brings to valuable results and expectation, the individual is motivated to adopt the behavior and repeat it in the future.

Basic process of observational learning

According to social learning theory, modelings are a principle of learning through their informative function. During exposure, observers acquire mainly symbolic representations of the modeled activities which serve as leading factors for appropriate performances. Four predisposing factors are necessary that an individual can successfully model the behavior of someone else: attention, retention, motor reproduction, and motivation.

1. Attention Processes: Perceiving the model (79)

People cannot learn much from modeling if they do not concentrate and remember the behavior of the models. Attention processes determine what should be observed in the profusion of modeling influences and what information is extracted from ongoing modeled events. A number of factors influence the exploration and construal o f what is a model in the society and symbolic environment. Some of these factors involve the cognitive skills, preconceptions, and value preferences of the observers. Others are related to the salience, attractiveness, and functional value of the model activities themselves.

Copyright by Mahidol University

Others skill pertain to the structural arrangements of human interactions. Associational networks largely determine the types of models to whom people have ready access and the styles of behavior they repeatedly observe and learn.

2. Retention Processes: Remembering the model (79)

People cannot be much influenced by modeled events if they do not remember them. Retention involves an active process of transforming and restructuring information about events for memory representation in the form of rules and concepts. Behavioral concepts should be distinguished from scripts, which are sometimes used to characterize the cognitive representations of modeled styles of behavior. Behavioral conceptions embodying production rules serve as general guides for constructing actions to fit changeable circumstances, whereas scripts are skin to robotic enactment of fixed action sequences. Retention is greatly created by symbolic transformations of modeled information into memory codes and by cognitive rehearsal of the coded information Generative codes that extract the underlying structure from specific behavioral instances enable observers to create new variants of actions that fit the structure but go beyond what was seen or heard. Preconceptions and affective states exert biasing influences on these representational activities. Similarly, recall involves a process of reconstruction rather than simply retrieval of registered events.

3. Production processes: Translating memories in to behavior (79)

Conceptions are translated into appropriate courses of action. Earlier, we saw that this translation is achieved through a conception-matching process. Conceptions guide the construction and execution of behavior patterns, and the adequacy of the action is compared against the conceptual model. The behavior is then modified on the basis of the comparative information to achieve close correspondence between conception and action. The more extensive the subskills that people possess, it is easier to integrate them based on modeled information to produce new behavior patterns. When deficits exist, the subskills required for complex performances must first be developed by modeling and guided enactment.

Copyright by Mahidol University

4. Motivational Processes: From observation to action (79)

Social cognitive theory distinguishes between acquisition and performance, because people do not perform everything they learn. Performance of behavior is influenced by three major types of incentive motivators: direct, vicarious, and self-esteem. People are more likely to exhibit modeled behavior if it results valuable outcomes than if it had unrewarding or punishing effects. The observed detriments and benefits experienced by others influence the performance of modeled patterns in the same way as directly experienced consequences. People are motivated by the successes of others who are similar to themselves. But they are discouraged from pursuing courses of behavior that they have often seen result in adverse consequences. Personal standards of conduct provide a further source of incentive motivation. The evaluative reactions, people have to regulate their own behavior which learned from observation activities they are most likely to pursue. They pursue activities that they find self-satisfying and that give them a sense of worth and reject those of which they personally disapprove.

Modeling (78)

Many behaviors that people exhibit have been acquired through observing and modeling others.

Types of Models

Bandura identifies three different types of models.

1. Live model is an actual person demonstrating a particular behavior.

2. Symbolic model is a person or character portrayed in a film, television show, book, or other medium.

3. Verbal instructions are descriptions of how to behave without an actual model being present at all.

Effects of Modeling on behavior (78)

Social learning theorists believe that modeling has at least three effects.

1. Modeling teaches new behaviors. Individuals can learn entirely new behaviors by observing others perform those behaviors. For example, by listening to and imitating the sounds of others, a person learns to speak new words.

Copyright by Mahidol University

2. Modeling inhibits and disinhibits previously learned behaviors.
3. Modeling elicits similar behaviors.

2.3 Food experiencing for preschool child

The importance of food experience in preschool child

Consumption of a healthy diet among young children is essential for normal growth and development and to prevent a variety of nutrition-related health problems such anemia, growth retardation, malnutrition, compromised cognitive achievement, obesity, dental caries, and chronic diseases in later life. Children are the important resource and thus deserve the best possible education for their present and future health (80).

Preschool children are becoming increasingly able to think, but their reason is somewhat unsystematic and does not readily lead to abstract generalizations or formation of logical concepts. They learn by manipulation of the environment rather than by passive listening, and by exploring, questioning, comparing, and labeling. Physical manipulation skills are being developed when children touch, look, mix up, turn over, and throw. Children take on more initiative, are more purposeful, and are eager to learn, usually from other people; they observe their parents, teachers, and other children, they role play, and they start to accumulate and process information (80).

Research evidence suggests that children are not born with the innate ability to choose a nutritious diet; but, their food habits are learned through experience and education (80). Children appear do not to be born with the natural ability to choose a nutritious diet; they must learn to do so. Children are born with a preference for the sweet taste. They also show a negative reaction to bitter and sour tastes and a neutral response to the salty taste. Other preferences appear to be learned. It has also been found that food preference food is a major determinant of food intake in young children. The accumulating evidence from research thus suggests that “early experience with food and eating is crucial in the development of food acceptance patterns, both in terms of the acquisition of food preferences and the regulation of food intake. ” Everyday experience with food and eating has an impact on food acceptance

Copyright by Mahidol University

and intake in several ways. For instance, familiarity with food in very young children show a neophobic response or reluctance to taste new or unfamiliar foods. This natural and protective mechanism is one of the most common reasons for food rejection; however, it has been shown that neophobia can be overcome and food acceptance or preference can be increased with exposure (80).

Birch and Fisher (81) think that children's eating is modified by exposure and accessibility of foods by modeling behavior of peers, siblings, and parents, the physiologic consequences of ingestion, and child-feeding practices. In addition, they mentioned the studies related food preference and eating selection with the exception of sweet and salty foods, acceptance of new foods does not occur instantly. However, after repeated opportunities to consume new foods children increased their favorite to new taste and accepted that food, it might take 5 to 10 exposures. These findings emphasize the central importance of early experience with foods and food acceptance; children come to like and eat what is familiar.

Lytle et al., (82) in a study with 60 children, found that 4 to 7 year olds children can comprehend concepts such as energy, a strong heart, that "good foods keep germs out of the body," and that a low-fat diet keeps the heart healthy. They also found that a nutrition education intervention significantly increased the children's perception that health and nutrition are related concepts. Thus, preschoolers are developing some emerging understanding of relevant concepts.

Gorelick and Clark (cite in 80) have noted that 3 to 5 year olds children can easily identify foods. Therefore, food experience in preschool child can be opportunities to learn about benefit and importance of food from direct experience. There were many people mentioned to food experience as follows:

Hilderbrand (48) supported that food and cooking experiences provided within the curriculum have been encouraged because of the children's high interest level. They enjoy helping food preparation, eating foods, and talking about food.

Mayesky (cite in 47) stated that foods are a part of each child's experience. Foods and cooking are interesting for children. All of their senses are used in food activities. They see the foods, smell them, touch them, and taste them. Other learning is enhanced by food activities, too. Art, sciencing, and aesthetics are all related to cooking in some way. Food activities help children develop new concepts in many

Copyright by Mahidol University

areas such as language, arts, sciencing, health and safety, and mathematics. Children learn best when they experience the world—by touching, tasting, smelling, sight, and hearing. If you wish to make the most of any food experience, children must be directly involved with real food and given as much responsibility as possible for growing, selecting, preparing, and eating the food.

Beaty (49) found that children learn very quickly what foods we consider important, not by what we say but by observing the kinds of food we serve in the classroom. If you want children to become acquainted instead with delicious fruits and interesting vegetables, plan some exciting food activities with these foods as well.

Moreover, there was a study found that food experience in early life was a prominent factor for shaping current fruit and vegetable trajectories. Early experiences provided lasting "food roots" that set people on trajectories or provided reference points for later consumptions. Participation in family activities and rituals that included vegetable and fruit intake, experience with a variety of fruit and vegetables, experience with preparing fruit and fresh vegetables, and pleasurable memories of the taste of fruit and vegetables were all mentioned as reasons that people continued to like those foods in the future. People with favorable early experiences with fruit and vegetables described more positive trajectories of higher lifelong fruit and vegetable consumption (29). Consequently, children's early nutritious food experiences are critical for helping children to adopt healthful nutrition attitudes and eating habits.

Although young children's eating habits are formed mostly at home, often a child's first eating experience away from his family is in the daycare center (45). For this reason, the daily food program in the preschool will perform the child's good attitude toward food. Specifically, appropriate food experiences instill good eating habits in childhood and build a physically healthy body (45). The teachers and other caregivers play a critical role in children's nutrition and health (83,84). When children spend approximately 6-7 hours a day in school, the children's eating habits are also learned at school. The school setting exudes influence through multiple factors, including teachers' mealtime behaviors, program routines, and the physical environment (85). The opportunity to use all their senses, to see, touch, taste, smell, and even to hear some foods makes a strong impression on children (48). Children's

Copyright by Mahidol University

accessibility and exposure to vegetables and fruit are important determinants of fruit and vegetable intake (86,87).

The objectives of food experiencing

Feeney (46) mention that the aim of food experience for kindergarten

1. help them to learn, accept, and enjoy taste of new foods.
2. help them to pride with felling of success.
3. use to be a medium for teaching nutrition.

Mack (45) state that an important of food experience is

1. To acquaint children with food variety and to encourage them to accept new foods.
2. To broaden the child's understanding of the relationship between diet and good health.

Furthermore, Hilderbrand (48) state that the primary goals that we want children to get from food experiencing is

1. To help the child's learning the sources of foods. As far as most children know, the grocery store is the source of food. Teachers can use visual aids, field trips, or a garden to help the children further their understanding of the primary sources of most foods.
2. To help the child's learning about taste of fresh foods. Many foods children eat are canned, bottled, or frozen. Teachers show children food in its fresh state for their students should.
3. To help the child's learning how the consistency of food changes. The children learn through various processes in the kitchen — heating, cooling, freezing, grinding, beating — the food is made ready to eat.
4. To help the child's learning about safety and cleanliness. Children learn safety concepts along with other concepts during cooking projects. Cleanliness of children's hands and of utensils can be taught during food activities.
5. To help the child's learning about sex roles. All activities are available to all children without regard to their sex. Food activities are great interest to boys. Teachers may have to dispel the notion that preparing food is only for girls.

Copyright by Mahidol University

For long-range goals for children's experiences with food, we want to help young children building on the following long-range goals. Children learn (48)

1. They need foods from all the Basic Five food groups in order to grow, run, and learn.

2. It is fun and interesting to try new foods.

3. Foods have names, physical characteristics, and flavors.

4. Plants and animals grown on farms or living in the water are primary sources of food.

5. The supermarket supplies some food products that are ready to eat and others that are ready to prepare.

6. Preparation of food includes such processes as heating, cooling, freezing, beating, and grinding.

7. Cooking tools, equipment, and processes have names.

8. The scientific method of observing, relating, interpreting and generalizing can be related to food.

9. Safety and cleanliness are important in the kitchen.

10. Both men and women like to cook and eat.

The principles of food experiencing for preschool child

Hilderbrand's suggestion (48), five major guides for planning food and nutrition experiences for young children are to personalize, simplify, dramatize, regularize, and mobilize. Details of this guides are followings.

1. Personalize

The teacher makes the subjects of food and nutrition come alive for each child by using following methods:

1.1 Through questioning and observation, the teacher finds out how advanced children are in their knowledge of foods and nutrition. What are the sources of foods that the children know? Meal or snack time is a good time for informal discussion. The consequences of eating or not eating certain foods can also be discussed. For example, one child, Cindy, reported to her kindergarten teacher that, "My dentist told me never drink any more pop or my teeth would all drop out."

Copyright by Mahidol University

1.2 Through observing, and talking with parents, the teacher learns the typical should be noted. Capitalizing on these food variations while planning specific projects may be a useful approach.

1.3 The teacher should weigh and measure the children and record the figures. A chart can be made for recording their growth during the year. With data from parents, the chart could begin since at birth. When adding to the chart from time to time, the teacher could tell the children that nutritious food helps them grow and stay healthy.

1.4 The children may bring pictures of favorite foods from home or find them in the school's magazine collection. The teacher could help them make a poster illustrating the basic food groups.

2. Simplify

Because nutrition information is very complex and abstract and nutrients are not something children can see, hold, simplifying food and nutrition concepts to meet the cognitive level of young children is essential and challenging.

3. Dramatize

The enthusiasm and involvement of the teachers and parents will inspire interest in food and nutrition among children.

To dramatize, the teacher and children can decorate the classroom with pictures of foods, gardens, farms, restaurants, or supermarkets, depending on the current focus. Books can be made available for individual and group reading. Songs, fingerplays, and poems can be taught.

Children can play supermarket if supplied with cartons or cans from foods. They can sort out the "good-for-you-foods" and the "not-good-for-you-foods." Food-related dramatic play concerning farming, fishing, gardening, restaurant and housekeeping can be carried on in either the classroom or play yard.

For older children puppets or flannel-board figures can be made and used to develop a play focusing on foods. If desirable, the play or puppet show could be given to younger siblings or parents, perhaps at a covered-dish dinner sometime during the term.

Copyright by Mahidol University

A large supermarket picture is available in school supply houses. Children can study such a picture and talk about the places they've been while shopping with parents.

4. Regularize

Food and cooking projects can become a regular part of the curriculum, occurring once or twice a week in some groups.

5. Mobilize

Sources of information about foods for the children can learn such as

5.1 The teacher will mobilize available resources – human and nonhuman – to get food and nutrition concepts across to children. Actually, the first resource is the teacher who becomes informed and serves as a model with the kind of food habits she or he wishes children to develop. The teacher has tremendous influence on the children in the class because children want to be like the teacher. If a positive approach is used when talking about nutritious food, children will be enthusiastic about these foods. If the children teacher enjoys and is willing to taste a wide variety of foods, children will be more inclined to do so.

5.2 Parents are a fine resource. They can help by trying out at home foods that are prepared at school.

5.3 There are many books, pictures, movies, and filmstrips that might be utilized.

5.4 Field trips

5.5 The kitchen might be considered the chemical laboratory of the school for young children. It may be the regular school kitchen, with a small table in one corner where an adult and a few children prepare their foods.

Contents of food experiencing in vegetables and fruits group

Eliason (cite in 47) suggests about contents of experiences with vegetable-fruit group as follows:

The unit of fruit : The concepts for activities are following.

1. Sources of fruits and growth
2. The season of fruits
3. Appearances, shapes, sizes, and amounts of fruit's seeds

Copyright by Mahidol University

4. Observation of ripe fruits

5. Changes of fruit's appearance such as pineapple juice, stirred pineapple, and pineapple that boil in syrup

6. Cleaning and preparation of fruits

7. Sizes of fruits

8. The differences of fruit's colors when it is unripe and ripe

9. Benefits of fruits

10. Edible portion of fruits

Examples of activities about the unit of fruits are following.

1. Excursions activities: to visit gardens to see fruits growing, garden products. A garden helps children understand that fruits are first growing plants.

2. Visitor: invitation visitor such as a farmer come to talk children about growing and caring fruits.

3. Art activities from parts of fruits

4. Cooking: such as jam, fruit salad, and fruit juice

5. Music: such as sing songs about fruits

6. Science activities: such as observation a change from unripe to ripe fruits, sizes, and different taste of fruits

7. Language activities: such as naming, reciting jingles and vocabularies about fruits

The unit of vegetables: The concepts for activities are following.

1. Sources of vegetables and growth

2. Colors of vegetables

3. Appearances, sizes, amounts and position of vegetable's seeds

4. The season of vegetables

5. Benefits of vegetables

6. Kinds of vegetables

7. Method of eating several kinds of vegetables such as eating raw vegetables and cooked vegetables

8. Edible portion of fruits

9. Differences of vegetable's shapes

Copyright by Mahidol University

Examples of activities about the unit of vegetables are following.

1. Excursions activities: to visit gardens to see vegetables growing, garden products. A garden helps children to understand about growth of vegetables.

2. Visitor: invitation visitor such as a farmer come to talk children about growing and caring vegetables.

3. Art activities from parts of vegetables

4. Cooking: such as vegetable soup and salad

5. Music: such as sing songs about vegetables

6. Science activities: such as observation and comparison of vegetable's seeds, sizes, and colors and preservation of vegetables such as preserving in salt and drying

7. Language activities: such as naming and vocabularies about parts of vegetables

2.4 Relevant researches

Stark et al. (cite in 80) used a behavioral program with 17 children aged 3 to 6 years to modify children's food choices during a snack time in a preschool program. They examined the effect of reinforcement or reward and measured its effect at school and at home. They found that stickers and praise given for choosing a healthy snack increased healthy snack choices, but only at school, not in the home. In addition, after withdrawal of reinforcements, snack choices returned to baseline levels.

Lytle et al., (82) in a study with 60 children, found that 4 to 7 year olds can comprehend concepts such as energy, a strong heart, that "good foods keep germs out of the body," and that "a low-fat diet keeps the heart healthy". They also found that a nutrition education intervention significantly increased the children's perception that health and nutrition are related concepts. Thus, preschoolers are developing some emerging understanding of relevant concepts.

In addition, Swadener (80) mentioned a study which found that food acceptance was also enhanced when the food was offered in a positive social context─for example, with positive attention by preschool teachers.

The study of Lawatsch (88), this study was to investigate the effect of two teaching strategies, benefit appeal and threat appeal, on the nutrition knowledge,

Copyright by Mahidol University

attitudes and food behavior of 103 preschool children (ranging in age from 3.5 to 5.25 years). Nutrition information was conveyed by using three traditional fairy tales that were rewritten to present basic nutrition concepts. The fairy tales modified for the benefit appeal group emphasized the positive, favorable results of eating a variety of vegetables, while those modified for the threat appeal group focused on the health and nutrition risks arising from not eating vegetables. Classes of preschool children were randomly assigned to a control group or to one of two experimental groups (the benefit appeal or threat appeal). Control group, children did not hear the modified fairy tales. Nutrition knowledge, attitude and behavior were assessed prior to and after the story presentations. Results revealed that the benefits appeal group had higher adjusted mean posttest knowledge scores than the threat appeal group, and that both experimental groups had significantly higher adjusted mean posttest knowledge scores than the control group. Both experimental groups had similar significantly higher adjusted mean post-assessment attitude scores than the control group, but experimental groups did not differ significantly.

This study revealed that we can take the several stories which were easily understandable to provide nutritional knowledge among this age group. In addition, teaching that emphasize values or benefits of nutritious food consumption may be better remember for children.

The study of Cason (89), describes the evaluation of a preschool nutrition education program based on the theory of multiple intelligences that studied among 6102 preschool-age children (age 3-5 years) attending 229 daycare facilities in 36 counties in a Southern state. The theory of multiple intelligences is a theory of learning that further attempts to explain the process by which individuals effectively interact with the task and the environment, there are eight intelligences, distinct ways that people learn and know about reality: interpersonal, intrapersonal, bodily-kinesthetic, linguistic, logical-mathematical, musical, naturalist, and spatial-visual. The curriculum was developed around the core topics of healthy snacking, fruit and vegetable identification, and the Food Guide Pyramid. The expected educational outcomes included increasing nutrition knowledge and improving attitudes and food behavior among preschool children. The nutrition educators provided a series of 12 lessons for preschool-age children in daycare settings. The lessons were about 40

Copyright by Mahidol University

minutes in length, were provided every 2 weeks, and were delivered to groups, averaging 18 children per group. In this program, multiple intelligences teaching strategies were used to educate preschool-age children about healthy eating. The curriculum incorporated activities in each category of intelligence and included stories, books, cassettes, videotapes, cooking, field trips, games, posters, discussions, computer lessons, tasting parties, songs, puzzles, art projects, role playing, skits, and puppets. Developmentally appropriate materials were used, and activity-based learning experience facilitated acquisition of food and nutrition concepts.

The results of this study found that preschoolers can learn the names of different foods and in which food group. Children reported an increased willingness to taste different foods. Parents' surveys pre- and post intervention indicated that children increased consumption of foods in the five food groups and decreased consumption in the fats, oils, and sweets section of the Food Guide Pyramid. The overall positive results of the impact evaluation indicate that when this curriculum was used, preschoolers increased knowledge about foods and food groups and improved food and nutrition behaviors. From this study revealed that variety, interesting, fun activities with food and conformable with child development could improve children's consumption behavior.

Panomporn Sirithaporn (47) evaluated result of modification of K3 food experiences program to food knowledge and dietary behaviors in preschool children compare to the traditional program. The children's age between 5 and 6 years, devised into study and control group, 15 preschool children each group. The study group was exposed to the researcher's modification of the K3 food experiences program, and control group exposed to the K3 food experiences program exposure (private school committee program). The researcher's food experiences program, 8 weeks period, composed of nutrition education, creating acquaintance and acceptance and activities that improve eating behaviors at both kindergarten and home. At school, the program consisted of experience with nutrition education, creating acquaintance and acceptance of food for teachers and at home there were document about creating acquaintance and acceptance of food for parents. Results show both knowledge and eating behavior scores of study group were statistical significantly higher than control group.

Yaovanee Wongsiri (37) studied effects of a eating behavior modification

Copyright by Mahidol University

program for preschool children that base on the PRECEDE Framework by Green and colleague and the Social Learning theory by Bandura. This program were providing information for parents and using reinforcement for children. In addition, the program consisted of food preparing education for parents (for their child) and teacher-parent focus group discussion including cooking activities and education for children to learn kinds and benefits of basic food groups and to create positive attitude of food intake. The period of this study was 11 weeks. Subject was 48 preschool children (3-5-years-old). The study was pretest and posttest design. Data were collected from the parental questionnaires, teacher-parent focus group discussion and observation, interview and examination with children. Results of the analysis were significantly statistical increasing in knowledge, attitude, and food eating behavior after intervention. Moreover, from data analysis found that there were related results between quantitative and qualitative data.

Two mentioned studies indicated that variety method and collaboration between the teachers and parents were essential to improve preschoolers' eating behaviors.

Copyright by Mahidol University

CHAPTER III
MATERIALS AND METHODS

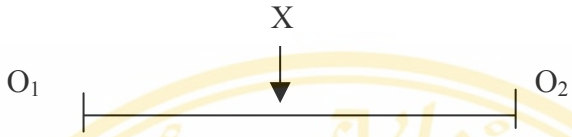
This research was an experimental design to study the effectiveness of the food experience program on promoting vegetable and fruit consumption among kindergarten children (K1) who were studying in Sukhothai School, Bangkok metropolitan area. The program was guided by food experiences and applied the Social Learning Theory. This chapter describes the responding materials and methods used in this study that are composed of:

A. Research Design
B. Populations and Sample
C. Research Instruments
D. Research Procedures
E. Data Analysis

Copyright by Mahidol University

A. Research Design

This study was a quasi-experimental study with one group pretest-post-test design. The study was designed as shown in Figures 5 and 6.



O_1 refers to data collection before intervention.

O_2 refers to data collection after intervention.

X refers to intervention of food experiences in different kinds of vegetables and fruits.

Figure 2 Research Design Diagram

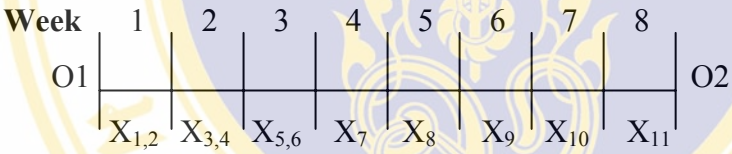


Figure 3 Experimental Diagram

O_1 Referred to baseline data and pretest data before intervention. The baseline data consisted of general data of the sample. The pretest data was collected from direct observation of the students' vegetable and fruit-eating behavior at school lunch that included the kinds, the amounts of vegetable and fruit intake, and the scores of vegetable and fruit-eating behavior.

O_2 Referred to the post-test data collected from direct observation of the students' vegetable and fruit-eating behavior at school lunch that included the kinds, the amounts of vegetable and fruit intake, and the scores of vegetable and fruit-eating behavior.

$X_1, X_2, \ldots X_{11}$ Referred to the food experience program. The food experience program was an operational plan that provided food experience activities for persuading children to eat vegetables and fruit by using principles, methods, and media according

Copyright by Mahidol University

to the Social Learning Theory. The program consisted of 11 activities providing knowledge of vegetable and fruit-eating benefits and creating acquaintance and acceptance of vegetables and fruit. The program was conducted during 8 consecutive weeks. Details of the program are explained in the section titled research procedures.

B. Population and Sample

Population

The population of this study was the kindergarten students, 4-5 years old, who were studying in the first semester, academic year 2003, Sukhothai School, Bangkok metropolitan area.

Sample

The sample selecting method of this study was purposive sampling, that selected one classroom (37 students) of the kindergarten students studying in K1 in the first semester, academic year 2003, Sukhothai School, Bangkok.

Selection of the sample

There were two classrooms (1/1 and 1/2) in the class of kindergarten level 1 at Sukhothai School. More than half of students did not eat vegetables in K 1/1 (53%), but in K 1/2 there were only 43% who did not eat vegetables (Data gathered from a preliminary survey by asking 6o parents). Therefore, the students in K 1/1 were selected to be the sample in this study.

C. Research Instruments

In this study, there were three types of instruments that consisted of the general data collection instruments, the program evaluation instruments, and the implementation instruments.

1. The general data collection instruments

This instruments were questionnaires composed of four sections as follows:

Section 1 consisted of three parts:

Part 1 Socio-demographic characteristics of parents: age, education, occupation level, marital status, and family income

Copyright by Mahidol University

Part 2 Socio-demographic characteristics of students**:** gender, birth order

Part 3 Families' vegetable and fruit consumption behaviors

This part contained questions related to frequency of preparing vegetables and fruit for eating at home.

Section 2 Parental behaviors to encourage their children to eat vegetables and fruit

This section contained questions related to parental behaviors to promote, encourage, and persuade their child to eat vegetables and fruit at home.

Section 3 Students' vegetable and fruit-eating behavior at home

This section was designed to assess the students' vegetable and fruit-eating behavior at home before and after the intervention and consisted of two parts:

Part 1 Students' vegetable-eating behavior

Part 2 Students' fruit-eating behavior

These questionnaires are shown in Appendix B.

2. The program evaluation instruments

In this study, the researcher would promote increased consumption of fresh fruit and dark green leafy and deep yellow vegetables among children in our sample. Therefore, the kinds of vegetables and fruit in preparing the menu for evaluating the program consisted of five kinds of vegetables (Chinese kale, Chinese white cabbage, Ivy gourd, Chinese cabbage, and pumpkin) which were dark green leafy and deep yellow vegetables and easy to cook and five kinds of fruits (rambutan, guava, ripe papaya, pineapple, and banana) which were seasonable fruits, nutritious fruits and easy to eat for children. These kinds of vegetables and fruit were selected by the researcher and approved by the teacher who was responsible for school lunch.

Therefore, there were five times for direct lunch observation of the students' vegetable and fruit consumption at lunch time during two weeks before and after intervention (pretest and post-test). The pretest was administered prior to the initiation of the first activity, and the post-test was administered at the end of the eleventh

Copyright by Mahidol University

activity. The lunch menu plan for the evaluation program on the observation days, both pretest and post-test, were similar. The menu plan consisted of five menus which contained the vegetables and fruits as follows:

1. The first time of observation, the selected vegetable was Chinese kale and the fruit was rambutan.

2. The second time of observation, the vegetable was Chinese white cabbage and the fruit was guava.

3. The third time of observation, the vegetable was Ivy gourd and the fruit was ripe papaya.

4. The fourth time of observation, the vegetable was Chinese cabbage and the fruit was pineapple.

5. The fifth time of observation, the vegetable was pumpkin and the fruit was banana.

These instruments were observational records based on the students' vegetable and fruit consumption at school lunch, which were recorded by the researcher covering the three following parts:

Part 1 The kinds of vegetable and fruit intake of the students

Each kind of vegetable and fruit intake of the students were recorded into two levels as follows:

Recorded **0** level if the students ate that vegetable or fruit.

Recorded **1** level if the students did not eat that vegetable or fruit.

The total kinds of vegetable and fruit intake of the students ranged from 0 – 5.

Part 2 The amounts of vegetable and fruit intake of the students

The amounts of vegetable and fruit intake were weighed in grams and recorded as follows:

intake (gram) = weight (before eating) – weight (after eating)

The recording of the amounts of vegetable and fruit intake of the students included the following steps:

1. Place the name tag of each student on his/her plate.

2. Weigh and serve at least 50 grams of a vegetable for each student.

(1 serving of vegetable = 70 grams)

Copyright by Mahidol University

3. Weigh and serve at least 1 serving of a fruit for each student. One serving of each fruit was as follows:

One serving of rambutan = 4 PIECES (85 grams of edible portion)
One serving of guava = 120 grams
One serving of ripe papaya = 115 grams
One serving of pineapple = 110 grams
One serving of banana = 1 fruit (110 grams of edible portion)

4. Weigh vegetable and fruit after the student finished eating.

5. Record the amounts of each student's vegetable and fruit intake in grams on the observational record form**.**

Part 3 The scores of vegetable and fruit-eating behavior

The scores of vegetable and fruit-eating behavior were recorded while students were eating lunch. The scores were recorded into three levels as follows:

Scores	**Appearance of eating behavior**
2	eat by her/himself
1	eat when persuaded
0	do not eat even when persuaded

The scores of vegetable and fruit-eating behavior of the students ranged from 0 – 10.

Construction and Improvement of Questionnaires and Observational record

The questionnaires were developed for data collection by the following process:

1. Review related literature, concepts and theories, and previous studies

2. Limit scope of questionnaire content and observational record according to objectives and hypothesis of this study.

3. Construct the first draft of the questionnaires and observation record form, and the criteria for interpretation.

4. Submit the questionnaires and observation record form to advisors to verify content validity and sequence of questions.

5. Correct the questionnaires and observation record form.

Copyright by Mahidol University

6. Pilot the observation record form with 32 students, who had similar characteristics to the students in this study; they were the students in K1/2 at the same school.

3. The implementation instruments

In this study, the food experience concept and Social Learning Theory were applied to plan activities for the students for promoting vegetable and fruit consumption. As it was guided by the Social Learning Theory, both personal and environmental factors influenced behavior. The cognitive process is an important causal influence upon the impact of both personal and environmental factors in ways that can initiate behavior change. In this study, the researcher was particularly interested in explanations of learning by observation. In addition, the researcher chose to focus on a variety of activities and symbolic models that were appropriate for young children. The accessibility and availability of vegetables and fruit in school are important for creating acquaintance and acceptance for vegetables and fruit among the students. Thus, the intervention also emphasized procedures to increase opportunities during school lunch for children to eat a variety of vegetables and fruit. Everyday of activities, were incorporated, such as preparing lunch meal with vegetables and fruit for the students.

The lesson plans for promoting vegetable and fruit consumption behavior among kindergarten children covered the objectives of the research and conformed to the concept of food experience program, social learning theory, and child development. There were 11 activities in 8 weeks of the experimental phase. The implementation instruments consisted of:

3.1 Lesson plans were created for promoting vegetable and fruit consumption behavior among kindergarten children. These plans covered the objectives of the research and conformed to the concept of the food experience program, social learning theory, and child development. The activity plans consisted of 11 lesson; each time about 30-40 minutes. The methods used were learning from the symbolic models (a cartoon VCD and a tale), viewing the real vegetables and fruit as well as eating vegetables and fruit, watching A puppet show and A slide show, planting vegetables, cleaning and preparing fruit and vegetables, cooking, playing games, including listening to music tape-cassettes, art activity,

Copyright by Mahidol University

discussion, and a tasting party. The lesson plans used in this program for each of the activities are shown in Appendix C.

3.2 Cartoon VCD (Popeye)

3.3 Tale (Nu Nid's Pumpkin)

3.4 The song cassettes "Vegetables Dance" and "Fruits Sing a Song" (ผักเต้นระบำ และ ผลไม้ร้องเพลง)

3.5 Hand puppet

3.6 Slide show with computer

3.7 Pictures and posters for an exhibition

3.8 Several real vegetables such as carrots, ivy gourd, Chinese white cabbage, etc. and the real fruits such as guavas, ripe papaya, oranges, bananas, pineapple etc. were used for accompanied the activities.

Lesson plan development for program implementation

The researcher conducted the food experience program on promoting vegetable and fruit consumption among kindergarten children by using lesson plans for teaching. The lesson plans were developed by:

1. Review related literature; concepts and theories, and previous studies as guidelines for construction consisting of the following topics:
   - Preschool child development
   - Social Learning Theory
   - Food experiencing for preschool child
   - Relevant research
2. Investigate the teacher's opinions about vegetable and fruit consumption behaviors of her students.
3. Develop the food experience program to promote vegetable and fruit consumption among the kindergarteners.
4. Submit the plan to the advisor and consult the teacher to verify its content and clarity including approval of the plan, and corrections.

Copyright by Mahidol University

D. Research Procedures

Preparation phase

1. Introductory letters were prepared by the Faculty of Graduate Studies, Mahidol University, and delivered to the Office of Primary Education, in Bangkok. The letter was taken to Sukhothai School for cooperation and permission in the experimental study.

2. The researcher consulted the Academic Deputy Director of the school and a homeroom teacher of K1/1 to introduce and explain the objectives of the study, set AN appointment schedule, data collection methods, and other details of the study before implementation.

3. The researcher dealt with the teacher who was responsible for school lunch to advise and set the menu of school lunch for the kindergarteners during the pretest period, program implementation period, and post-test period.

Pre-implementation phase (two weeks)

Before beginning the program, the parents of the participants were informed about the program including the goals and the process of the program. General data was collected prior to the experiment by structured questionnaire. In addition, the parents provided written consent for their child's participation before beginning the program.

The pretest data were observed and recorded by the researcher. These data were the kinds, the amounts, and the scores of vegetable and fruit-eating behavior of students during lunchtime observations in the classroom.

Implementation phase (eight weeks)

There were 11 activities in the experimental phase, which were conducted by the researcher and assisted with by the teacher and assistants. Each activity was implemented for 30-40 minutes. The participants were involved by giving the experience for acquaintance and acceptance of vegetables and fruit eating. The intervention provided additional opportunities to eat vegetables and fruit with additional servings of vegetables and fruit at lunch each day of the activities.

Copyright by Mahidol University

Knowledge about health benefits of vegetable and fruit consumption was introduced by the symbolic model. Moreover, sharing experiences about vegetables and fruit regarding eating behavior among students was performed. Before starting the activities in each time (after the 2nd week), the participants would listen to music cassettes about vegetables and fruit. The students had to participate in class by calling out the names of vegetables and fruit from pictures in classroom (The pictures of vegetables and fruit were hung on a wall in the classroom) and also discussed about the health benefits of vegetables and fruit. The program also involved preparing school lunch with vegetables and fruit everyday of the activities. (The menus of the school lunch in implementation phase are shown in Appendix C)

Assessments of each of the activities of the program were as follows:

1. Observe the children's attention on activities.
2. Observe the children's conversation and answers to the questions.
3. Observe the children's vegetable and fruit eating at lunch.
4. Record qualitative data from observation.

Details of activities for each time are as follows:

Week 1 Health benefits of eating vegetables and fruit (Activities1 and 2)

Activity 1 Cartoon: Popeye (40 minutes)

The objectives for this activity were: students will be able to

- learn about health benefits of eating vegetables and fruit.
- acquire good attitudes on vegetable and fruit-eating.
- be more acquainted with and accepting of various vegetables and fruit.
- be more motivated to eat vegetables and fruits.

Methods

1. Before starting the cartoon (Popeye), an introduction of children's eating behavior was performed such as children's breakfast and its ingredients including vegetable and fruit-eating.

2. Students were told to watch the cartoon and observe what happened to Popeye.

Copyright by Mahidol University

3. Students watched the cartoon (~ 25 minutes) (Popeye is a healthy and very strong man and he likes to eat spinach, which makes him very strong.)

4. Students discussed about the story.

5. The lesson concluded the health benefits of vegetables and fruit by using poster exhibition for explanation.

6. Students were advised to eat vegetables and fruit at lunch.

Activity 2 Tale: Nu Nid's Pumpkin (30 minutes)

The objectives for this activity were: students will be able to

- learn about health benefits of eating vegetables and fruit.
- acquire good attitudes on vegetable and fruit-eating.
- be more acquainted with and accepting of various vegetables and fruit.
- be more motivated to eat vegetables and fruits.

Methods

1. Before starting the activity, the students were motivated by discussion about cartoon (Popeye) and health benefits of eating vegetables and fruit.

2. Students were told that today they will listen to a tale (with illustrations) "Nu Nid's Pumpkin" (~ 20 minutes). (The tale's details are in Appendix C)

3. Students discussed the tale and concluded about benefits of eating vegetables and fruit.

4. Students sang songs "Vegetables Dance" and "Fruit Sing a Song" (ผักเต้นระบำ และ ผลไม้ร้องเพลง) and dancing activity.

5. Students were advised to eat vegetables and fruits at lunch.

Week 2 Kinds of vegetables and planting of vegetables (Activities 3 and 4)

Activity 3 Kinds of vegetables (30 minutes)

The objectives for this activity were: students will be able to

- learn about the kinds and names of vegetables.
- be more acquainted with and accepting of various kinds of vegetables.
- To encourage the students to eat vegetables and fruits.

Copyright by Mahidol University

Methods

1. Before starting the activity, the students were motivated by singing a song, “Vegetables Dance” and participating in a dancing activity.

2. Students were told about vegetables familiar to the children.

3. Students played a game, calling out the names of vegetables from pictures and real vegetables.

4. The differences of each vegetable was observed such as colors and shapes.

5. Students tasted food cooked with vegetables as ingredients [mixed vegetables stir-fry (carrot, pumpkin, and Chinese white cabbage) and morning glory stir-fry].

6. The vegetable pictures were hung on a wall in the classroom.

7. Students were persuaded to eat vegetables and fruits at lunch.

Activity 4 Planting vegetables (Morning glory) (ผักบุ้ง) (40 minutes)

The objectives for this activity were: students will be able to

- learn about planting vegetables.
- practice planting a vegetable.
- be more acquainted with and accepting of various vegetables and fruit among the students.
- be motivated to eat vegetables and fruits.

Methods

1. Students named the vegetables from pictures in the classroom.

2. Students viewed some vegetable seeds and observed differences.

3. Students viewed Morning glory that the researcher grew in a tray.

4. Students were divided into groups (five to six students each group).

5. Planting steps were explained and demonstrated.

6. Instruments for growing (tray, vegetable’s seed, and soil) were given to every group and students practiced planting their vegetable.

7. Students washed their hands after planting vegetables. (Trays of vegetables were put on the veranda of the classroom.)

Copyright by Mahidol University

8. Students were advised to eat vegetables and fruits at lunch.

Week 3 Kinds of fruits and source of fruits (Activities 5 and 6)

Activity 5 Kinds of fruits (40 minutes)

The objectives for this activity were: students will be able to

- learn about various kinds and names of fruit.
- be more acquainted with and accepting of various of vegetables and fruit among the students.
- be more motivated to eat vegetables and fruits.

Methods

1. Students played a puzzle game about fruit.
2. Students discussed each fruit from pictures and real fruits.
3. Fruits (ripe papaya, guava, pineapple, and rambutan) were split and children were asked to observe the different seeds as well as parts of fruit that we eat and do not eat and to prepare the fruit for lunch.
4. Fruit pictures were hung on a wall in the classroom.
5. Students were advised to eat vegetables and fruits at lunch.

Activity 6 Source of fruit and planting (including vegetables) (40 minutes)

The objectives for this activity were: students will be able to

- to learn about the source of fruit and planting (including vegetables).
- be more acquainted with and accepting of various vegetables and fruit.
- be more motivated to eat vegetables and fruit.

Methods

1. Students called out the names of fruit from pictures in class.
2. Students were asked to view a slide show (in computer) about A fruit garden (and vegetables) with explanation.
3. After the end of the slide show, Students discussed planting fruit at their home.
4. Students sang a song, “Fruit Sing a Song”
5. Students were advised to eat vegetables and fruit at lunch.

Copyright by Mahidol University

Week 4 / Activity 7 Purchasing and selecting vegetables and fruit (40 minutes)

The objectives for this activity were: students will be able to

- learn about purchasing and selecting raw vegetables and fruit.
- be more acquainted with and accepting of various of vegetables and fruit.
- be more motivated to eat vegetables and fruit.

Methods

1. Students discussed the market and were asked "who has ever gone the market with parent?"

2. Students were told that today we would go to the market with Nid and Noy (hand puppets).

3. The hand puppet were introduced (details are shown in Appendix C). There were real vegetables and fruit (tomatoes, Chinese white cabbage, carrot, ripe papaya, rambutan, banana, and guava) on the table used for the puppet show.

4. After the end of the puppet show, the teacher and students concluded about purchasing and selecting vegetables and fruit.

5. Students were advised to eat vegetables and fruit at lunch.

Week 5 / Activity 8 Cleaning and preparing fruits before eating (40 minutes)

The objectives for this activity were: students will be able to

- learn about cleaning and preparing fruit before eating.
- practice cleaning fruits.
- be more acquainted with and accepting of various of vegetables and fruit.
- be more motivated to eat vegetables and fruit.

Methods

1. Students were told that there was raw fruit prepared for them to eat at lunch.

2. Instruments for cleaning fruit were prepared and methods of cleaning and preparing fruits before eating were explained.

3. Cleaning and preparing fruits which have and have no peel were demonstrated and explained.

4. Students were asked to observe water used to clean fruit, and discuss the dirtiness of fruit.

Copyright by Mahidol University

5. Students prepared all fruits for lunch.
6. Students were advised to eat vegetables and fruit at lunch.

Week 6 / Activity 9 Cooking (40 minutes)

The objectives for this activity were: students will be able to

- learn about cooking and preparing vegetables before eating or cooking.
- practice cooking.
- build acquaintance and acceptance of various vegetables and fruit.
- enhance motivation to eat vegetables and fruit.

Methods

1. Students were told that today they had to cook ivy gourd soup.
2. Students were divided into groups (5-6 students each group).
3. The method of cooking ivy gourd soup was explained.
4. Cleaning vegetables before cooking was demonstrated.
5. Students were asked to observe water after cleaning vegetables and discussed the dirtiness of vegetables and chemical contamination such as a manure or fertilizer, insecticide, soil, etc.
6. Ivy gourd was given to each group to select leaves for cooking (the teacher and the reseacher helped children in selecting).
7. The cooking process of ivy gourd soup was demonstrated.
8. After cooking, ivy gourd soup was give to students for lunch.
9. Students were advised to eat vegetables and fruit at lunch.

Week 7 / Activity 10 Art activity “Puk Plang Gai” and “Picture from Banana Stalk” (ผักแปลงกายและภาพพิมพ์จากก้านกล้วย) (40 minutes)

The objectives for this activity were: students will be able to

- practice an art activity from vegetables and fruit.
- remember the names and appearances of vegetables and fruit including their essential parts
- build acquaintance and acceptance of various vegetables and fruit.
- enhance motivation to eat vegetables and fruit.

Copyright by Mahidol University

Methods

1. Students were told that today they had to make “Puk Plang Gai” (in Thai ผักแปลงกาย) from various vegtables and flower pictureS from a banana stalk.

2. The story “Puk Plang Gai” was read showing pictures in the book and samples of ตัวผักแปลงกาย that the researcher had made.

3. Flower pictures made from a banana stalk were exhibited.

4. Students were divided into groups (five to six students each group).

5. Methods of making “Puk Plang Gai” (ตัวผักแปลงกาย) from various vegetables and the flower picture made from a banana stalk were demonstrated.

6. Vegetable parts were given (the researcher had prepared for this activity), banana stalks, paper, and water colors to each group.

7. Each group was instructed on what to do the Puk Plang Gai and flower pictures were shown at the end.

8. Students cleaned classroom together before eating lunch.

9. Students were advised to eat vegetables and fruit at lunch.

Week 8 / Activity 11 Vegetable and fruit party

The objectives for this activity were: students will be able to

- remember the names and appearances of vegetables and fruit.
- build acquaintance and acceptance of various vegetables and fruit.
- enhance motivation to eat vegetables and fruits.

Methods

On the day before party day

1. Prepared classroom with ribbon and color papers

2. Prepared paper hats with pictures of vegetables and fruits for every student on party day.

On the party day

1. Prepared foods and fruits (vegetable stir-fry, ripe papaya, banana, pineapple, guava, and rambutan) for the party and put it on A table in the classroom.

Copyright by Mahidol University

2. Gave hats to every child and asked them to notice vegetable and fruit pictures on their hats.

3. Played puzzle game and musical chair game.

4. Gave rewards to students who ate many vegetables and fruit during intervention.

5. Ate lunch meal together.

Evaluation Phase (two weeks)

Data was collected for evaluating the program using the same method as pretest when the program finished. In addition, the researcher sent the questionnaires to the parents for qualitative data of program evaluation and collected them the next day.

E. Data Analysis

Data analysis of the study was conducted using a computer program as follows:

1. Descriptive statistics containing mean, standard deviation, frequency and percent distribution were performed to describe general characteristics of the samples.

2. The Wilcoxon's Signed Ranks Tests, statistical significance at an α level of ≤ 0.5, were used to compare mean pretest and post-test for kinds, amounts of vegetable and fruit intake of the samples, and scores of their vegetable and fruit-eating behaviors.

Copyright by Mahidol University

CHAPTER IV
RESULTS

This quasi-experimental research aimed to study the effectiveness of the food experience program on promoting vegetable and fruit consumption (kinds, amounts of vegetable and fruit intake, and scores of eating behavior) among kindergarten children. from this study, the results of the data analysis are presented in three parts as follows:

Part I General Characteristics of the samples

1.1 Socio-demographic characteristics of parents

1.2 The students' characteristics

Part II The results of the implementation of the food experience program on promoting vegetable and fruit consumption among kindergarten children

2.1 The kinds of vegetable and fruit intake of the kindergarten children

2.2 The amounts of vegetable and fruit intake of the kindergarten children

2.3 The scores of vegetable and fruit-eating behaviors of the kindergarten children

2.4 Qualitative results

Part III Hypotheses testing

Copyright by Mahidol University

Results

A maximum of 37 students of K1/1 were observed before intervention, but only 26 eligible students (13 boys and 13 girls) were retained for analysis. From the 37 students, 7 students were orphans, 1 student quit school, and 3 students were absent during intervention more than 20% of all lessons.

Part I General Characteristics of the samples

1.1 Socio-demographic characteristics of parents

Age of parents: Most of the fathers (50%) were between 30-34 years (mean 33.38). Similarly, most of the mothers (42%) were 30-34 years (mean 30.08).

Education level of parents: The majority of fathers (42%) finished secondary school, the next group finished grade 6 (27%), and graduated at diploma or vocational certificate level (23%), only 8% of fathers had higher than bachelor's degree. For mothers, most of them (42%) finished secondary school, the next group finished grade 6 (39%), and graduated at diploma or vocational certificate level (11%), and only 8% of mothers had higher than bachelor's degree.

Occupation of parents: The highest percentage of the fathers' occupation were employees (65%), the next group was government officials (23%). While 46% of mothers were employees, 34% of them were housewives.

Family income: The highest group, 38% of families had incomes between 8,000-10,999 baht/month (mean=9,003.85, S.D.=5,263.72, min=2,000, and max=27,000).

Marital status of parents: Parents' marital status was married (73%), and others were divorce.

The socio-demographic characteristics of parents are shown in Table 3.

Copyright by Mahidol University

Table 3 Number and percentage of the students by socio-demographic characteristics of the parents (N = 26)

Socio-demographic characteristics	Number	Percentage
Age (father)		
< 25 years	1	4.0
25-29 years	4	15.0
30-34 years	13	50.0
35-39 years	3	11.5
40-44 years	3	11.5
≥ 45 years	2	8.0
Mean ± S.D. = 33.38 ± 6.52 Min = 23 Max = 50		
Age (mother)	**26**	**100.0**
< 25 years	3	11.5
25-29 years	8	31.0
30-34 years	11	42.0
35-39 years	3	11.5
40-44 years	1	4.0
Mean ± S.D. = 30.08 ± 4.36 Min = 23 Max = 40		

Copyright by Mahidol University

Table 3 Number and percentage of the students by socio-demographic characteristics of the parents (continued)

Socio-demographic characteristics	Number	Percentage
Education level (fathers)		
Primary school	7	27.0
Secondary school	11	42.0
Diploma or Vocational Cert.	6	23.0
Bachelor's Degree	-	-
Higher than Bachelor's Degree	2	8.0
Education level (mothers)	**26**	**100.0**
Primary school	10	39.0
Secondary school	11	42.0
Diploma or Vocational Cert.	3	11.0
Bachelor's Degree	-	-
Higher than Bachelor's Degree	2	8.0
Occupation (fathers)	**26**	**100.0**
Employee	17	65.0
Merchant	1	4.0
Government official	6	23.0
State enterprise	2	8.0
Occupation (mothers)	**26**	**100.0**
Employee	12	46.0
Merchant	2	8.0
Government official	2	8.0
State enterprise	1	4.0
Housewife	9	34.0

Copyright by Mahidol University

Table 3 Number and percentage of the students by socio-demographic characteristics of the parents (continued)

Socio-demographic characteristics	Number	Percentage
Family income (Baht per month)		
< 5,000	3	11.0
5,000-7,999	8	31.0
8,000-10,999	10	38.0
11,000-13,999	2	8.0
14,000-16,999	1	4.0
17,000-19,999	-	-
≥ 20,000	2	8.0
Mean (x) = 9,003.85 S.D. = 5,263.72 Min = 2,000 Max = 27,000		
Marital status		
Married	19	73.0
Divorce/Separate	7	27.0
Family characteristic (students live with)		
Parents	13	50.0
Parents, child, and relative	6	23.0
Only father/mother and relative	6	23.0
Only relative	1	4.0

Copyright by Mahidol University

1.2 The students' characteristics

The student sample comprised 50% boys. Regarding the birth order of the students, the majority of them were the second child (46%), 42% were the first child, and 12% were the third child. Most of them had one sibling (65%), and 23% were an only child (Results are shown in Table 4).

Table 4 Number and percentage of the students' characteristics (N = 26)

Students' characteristics	Number	Percentage
Birth order		
First child	11	42.0
Second child	12	46.0
Third child	3	12.0
Child family members		
1	6	23.0
2	17	65.0
3	2	8.0
4	1	4.0

Nutritional Status: An assessment of the nutritional status was carried out before intervention by using the standard weight, height and nutritional status indicator of Thai population aged 1 day to 19 years, developed by the Department of Health, Ministry of Public Health (1999) as A reference.

The mean weight of boys was 17.96 ± 2.85 and of girls was 16.27 ± 2.42. The mean height of boys was 107.62 ± 3.3 and of girls was 103.79 ± 4.08. (Results are shown in Table 5.)

At the beginning of the intervention, 84.6% of the students were at the normal level by weight for height (at the -1.5 S.D. to +1.5 S.D.), 7.7% of the students were slightly underweight (-2.0 S.D. to -1.5 S.D), and 7.7% of the students were slightly

Copyright by Mahidol University

overweight (+1.5 S.D. to +2.0 S.D.). The nutritional status of the students is shown in Table 6.

Table 5 Number and percentage of the weight and height by sex of the students. (N = 26)

Weight and Height /Sex	**Boys** (*n* = 13)	**Girls** (*n* = 13)
Weight(kg)		
Mean	17.96	16.27
S.D.	2.85	2.42
Minimum	14.30	12.90
Maximum	24.70	20.60
Height(cm)		
Mean	107.62	103.79
S.D.	3.30	4.08
Minimum	102.00	96.50
Maximum	112.00	110.00

Table 6 Number and percentage of the nutritional status of the students. (N = 26)

Nutritional status	**Boys** (*n* = 13) n (%)	**Girls** (*n* = 13) n (%)	**Total** (*n* = 26) n (%)
Slightly overweight	1 (7.7%)	1 (7.7%)	2 (7.7%)
Normal	10 (76.9%)	12 (92.3%)	22 (84.6%)
Slightly underweight	2 (15.4%)	-	2(7.7%)

Copyright by Mahidol University

Part II The results of the implementation of the food experience program on promoting vegetable and fruit consumption among kindergarten children

2.1 The kinds of vegetable and fruit intake of the kindergarten children

Each kind of vegetable and fruit intake of the students was recorded in two levels (0 and 1). The total kinds of vegetable and fruit intake of the students ranged from 0 – 5. After intervention it was found that the average kinds of vegetables (from five kinds of vegetables: Chinese kale, Chinese white cabbage, ivy gourd, Chinese cabbage, and pumpkin) eaten by the students increased significantly from 2.15 to 3.62 (p-value < 0.001). For fruit, the kinds of fruit (from five kinds of fruit: rambutan, guava, ripe papaya, pineapple, and banana) eaten by the students increased from 3.35 to 3.54, but there was no significantly statistical increase (p-value = 0.434). These results are shown in Table 7.

Table 7 Comparison of mean kinds of vegetables and fruit eaten by the students before and after intervention (N = 26)

Kinds of vegetables and fruits	Min	Max	$\bar{X}$	S.D.	Z	P-value
Vegetables						
Before intervention	0.00	5.00	2.15	1.38		
					-3.657	0.000
After intervention	1.00	5.00	3.62	1.24		

Copyright by Mahidol University

Table 7 Comparison of mean of the kinds of vegetables and fruit eaten by the students before and after intervention (continued)

Kinds of vegetables and fruits	Min	Max	$\overline{X}$	S.D.	Z	P-value
Fruit						
Before intervention	0.00	5.00	3.35	1.41		
					-0.782	0.434
After intervention	0.00	5.00	3.54	1.21		

2.1.1 The kinds of vegetable and fruit consumption by gender before and after intervention

Regarding the kinds of vegetables eaten by the boys before and after intervention it was found that the average of the kinds of vegetables (from five kinds of vegetables) increased significantly from 2.23 to 3.77 (p-value = 0.016). The kinds of fruit eaten by the boys increased from 3.23 to 3.31, but there was no significantly statistical increase (p-value = 0.903). The kinds of vegetables eaten by the girls before and after intervention it was found that the average of the kinds of vegetables increased significantly from 2.08 to 3.46 (p-value = 0.004). For fruit, the kinds of fruit eaten by the girls increased from 3.46 to 3.77, but there was no significantly statistical increase (p-value = 0.305). These results are shown in Table 8.

Copyright by Mahidol University

Table 8 Comparison of mean of the kinds of vegetables and fruit consumption by gender before and after intervention

Kinds of vegetables and fruits	Min	Max	$\bar{X}$	S.D.	Z	P-value
Boy (N = 13)						
Vegetables						
Before intervention	0.00	5.00	2.23	1.36		
					-2.411	0.016
After intervention	0.00	5.00	3.77	1.17		
Fruit						
Before intervention	0.00	5.00	3.23	1.59		
					-0.122	0.903
After intervention	0.00	5.00	3.31	1.32		
Girl (N = 13)						
Vegetables						
Before intervention	0.00	5.00	2.08	1.44		
					-2.842	0.004
After intervention	0.00	5.00	3.46	1.33		
Fruit						
Before intervention	0.00	5.00	3.46	1.27		
					-1.027	0.305
After intervention	0.00	5.00	3.77	1.09		

2.2 The amounts of vegetable and fruit intake of the kindergarten children

Table 9 shows the mean amounts of vegetable and fruit intake (from five kinds of vegetables and five kinds of fruits) of the students in the study. Vegetable intake increased from 10.94 grams before intervention to 22.19 grams after

Copyright by Mahidol University

intervention. Fruit intake increased from 52.34 grams before intervention to 76.71 grams after intervention. It was significantly increased at p-value < 0.001 and p-value = 0.001 for vegetables and fruit, respectively.

Table 9 Comparison of the mean amounts (grams) of vegetable and fruit intake of the students before and after intervention (N = 26)

Amounts (grams)	Min	Max	$\bar{X}$	S.D.	Z	P-value
Vegetables						
Before intervention	0.00	36.25	10.94	11.21		
					-3.714	0.000
After intervention	5.00	53.33	22.19	15.88		
Fruit						
Before intervention	0.00	12.00	52.34	26.20		
					-3.226	0.001
After intervention	101.00	148.00	76.71	33.99		

2.2.1 The amounts of vegetable and fruit consumption by gender before and after intervention

Table 10 shows the average amounts of vegetable and fruit consumption by gender in the study. In the boy, vegetable intake (from five kinds of vegetables) increased from 11.65 grams before intervention to 24.47 grams after invention. Fruit intake (from five kinds of fruits) increased from 52.30 grams before intervention to 81.25 grams after intervention. It was significantly increased at p-value

Copyright by Mahidol University

= 0.004 and p-value = 0.007 for vegetable and fruit, respectively. The average amounts of vegetable and fruit intake of the girls in the study. Vegetable intake significantly increased from 10.23 grams before intervention to 19.91 grams after invention (p-value = 0.019). Fruit intake significantly increased from 52.38 grams before intervention to 72.18 grams after intervention (p-value = 0.043).

Table 10 Comparison of the mean amounts (grams) of vegetables and fruit consumption by gender before and after intervention

Amounts (grams)	Min	Max	$\bar{X}$	S.D.	Z	P-value
Boy (N = 13)						
Vegetables						
Before intervention	0.00	36.25	11.65	12.38		
					-2.900	0.004
After intervention	9.00	53.33	24.47	13.77		
Fruit						
Before intervention	0.00	93.75	52.30	27.78		
					-2.691	0.007
After intervention	12.00	139.00	81.25	33.84		
Girl (N = 13)						
Vegetables						
Before intervention	0.00	30.00	10.23	10.38		
					-2.355	0.019
After intervention	5.00	52.50	19.91	18.01		
Fruit						
Before intervention	0.00	101.00	52.38	25.67		
					-2.028	0.043
After intervention	15.00	148.00	72.18	34.89		

Copyright by Mahidol University

2.3 The scores of vegetable and fruit-eating behavior of the kindergarten children

From direct observation of students eating lunch (all five kinds of vegetables and fruits), it was found that the scores of vegetable and fruit-eating behavior significantly increased after intervention (p-value < 0.000 and p-value = 0.001 respectively). The mean scores of vegetable-eating behavior were 0.66 before intervention and 1.52 after intervention. The mean scores of fruit-eating behavior were 1.23 and 1.66 at before and after intervention, respectively. These results are shown in Table 11.

Table 11 Comparison of the mean scores of vegetable and fruit-eating behavior of the students before and after intervention (N = 26)

Scores of eating behaviors	Min	Max	$\bar{X}$	S.D.	Z	P-value
Vegetables						
Before intervention	0.00	1.80	0.66	0.49		
					-4.209	0.000
After intervention	0.20	2.00	1.52	0.51		
Fruit						
Before intervention	0.00	2.00	1.23	0.56		
					-3.397	0.001
After intervention	0.40	2.00	1.66	0.46		

Copyright by Mahidol University

2.3.1 The scores of vegetable and fruit-eating behaviors by gender before and after intervention

The scores of eating behavior were significant increasing between before and after intervention. The mean scores of vegetable-eating behavior were 0.72 before intervention and 1.67 after intervention (p-value = 0.003). The mean scores of fruit-eating behavior were significantly increased at p-value = 0.013; the mean scores were 1.32 and 1.72 before and after intervention, respectively. In the girls it was found that the scores of vegetable and fruit-eating behavior were significantly increased between before and after intervention. The mean scores of vegetable-eating behavior were 0.60 before intervention and 1.37 after intervention (p-value = 0.002). The mean scores of fruit-eating behavior were 1.15 and 1.60 before and after intervention, respectively (p-value = 0.012). These results are shown in Table 12.

Table 12 Comparison the mean scores of vegetable and fruit-eating behavior by gender before and after intervention

Scores of eating behaviors	Min	Max	$\bar{X}$	S.D.	Z	P-value
Boy (N = 13)						
Vegetables						
Before intervention	0.00	1.80	0.72	0.56		
					-2.936	0.003
After intervention	1.00	2.00	1.67	0.41		
Fruit						
Before intervention	0.00	2.00	1.32	0.61		
					-2.496	0.013
After intervention	0.60	2.00	1.72	0.42		

Copyright by Mahidol University

Table 12 Comparison the mean scores of vegetable and fruit-eating behavior by gender before and after intervention (continued)

Scores of eating behaviors	Min	Max	$\bar{X}$	S.D.	Z	P-value
Girl (N = 13)						
Vegetables						
Before intervention	0.00	1.20	0.60	0.43		
					-3.083	0.002
After intervention	0.20	2.00	1.37	0.57		
Fruit						
Before intervention	0.00	2.00	1.15	0.51		
					-2.516	0.012
After intervention	0.40	2.00	1.60	0.49		

2.4 Qualitative results

2.4.1 Qualitative data from answering questionnaires by the parents

From answering questionnaires by the parents after intervention about the changes of vegetable and fruit-eating behavior of the students at home, it was found that some parents reported the following observations:

One case reported that when her child came back home she said that "today, I ate vegetables," and often talked about vegetables such as "if I eat vegetables, will I be strong?", and she said "I have eaten vegetables" when she ate vegetables.

One case reported that my child ate some vegetables which she never ate before.

One case reported that her child ate more vegetables, her child told her that she ate vegetables at lunch (at school).

Copyright by Mahidol University

One case reported that her child ate more vegetables and fruits and very much like to eat vegetables and fruit.

One case reported that her child ate more kinds of vegetables and fruit.

One case reported that her child ate more kinds of vegetables.

2.4.2 Qualitative data from direct observation during intervention by the researcher

From direct observation during intervention by the researcher, the changes of vegetable and fruit-eating behavior of the students were found as follows:

- While watching the cartoon VCD (Popeye), the students were very interested and said that “Popeye is very strong,” “Popeye eats vegetables.” In addition, the students cheered Popeye when he can help Olive. After watching the cartoon, some boys induced their friend (who did not eat vegetables) to eat vegetables at lunch. They told their friends that “If you eat vegetables, you will be as strong as Popeye.” Some boys said “Yes, Popeye eats vegetables, so he is strong.”

- While listening to the tale (Nid’s Pumpkin), the students were also very interested. When they had finished, some girls said that “vegetables make Nid to be healthy.” Some girls said that “skin is also beautiful if we eat tomato” and some girls said that “cheeks are also rosy” while some boys said that “Popeye eats vegetables, so he is strong.” After listening to the tale (Nid’s Pumpkin), some girls induced their friend (who did not eat vegetables) to eat vegetables at lunch. They told their friends that “Nid eats vegetables” and some girls said that “if we eat vegetables, our skin will be beautiful.”

- After the second week of the implementation phase, the students showed interest in what vegetables and fruit they would eat at lunch. They observed their friends and induced their friends (who did not eat vegetables) to eat vegetables at lunch. The students always mentioned Popeye and Nid when they induced their friends to eat vegetables. Furthermore, the students would also observe their teacher’s eating behavior. When the teacher told them to eat vegetables, some students ate vegetables.

Copyright by Mahidol University

Part III Hypotheses testing

1. After intervention, the kinds of vegetable intake among kindergarten children significantly increased from 2.15 to 3.62 (p-value < 0.001). The kinds of fruit increased from 3.35 to 3.54, but it was not significantly increased (p-value = 0.434).

2. After intervention, the amounts of vegetable and fruit intake among kindergarten children were significantly increased, p-value < 0.001 and p-value = 0.001 for vegetable and fruit intake, respectively. Vegetable intake increased from 10.94 grams before intervention to 22.19 grams after intervention. Fruit intake increased from 52.34 grams before intervention to 76.71 grams after intervention.

3. After intervention, the scores of vegetable and fruit-eating behavior were significantly increased from before intervention. The mean scores of vegetable-eating behavior were 0.66 before intervention and 1.52 after intervention (p-value < 0.000). The mean scores of fruit-eating behavior were significantly increased at p-value = 0.001; the mean scores were 1.23 and 1.66 at before and after intervention, respectively.

Copyright by Mahidol University

CHAPTER V
DISCUSSION

This quasi-experiment research examined the effectiveness of food experience-based intervention to increase vegetable and fruit-eating among kindergarten children. On the basis of our study, we would advocate children to increase their eating of fresh fruits and dark green leafy and deep yellow vegetables. In this program, the researcher applied the concept of food experience combining the Social Learning Theory to promote vegetable and fruit-eating. Data were collected by direct observation during lunch in the school. This chapter presents the interpretation and discussion of the results.

The samples

The selected samples were from Sukhothai School in Bangkok which was a government school. Therefore, the sample of this study reflects only a group with a mean monthly household income of about 9,000 baht which was classified as moderate level of economic status. Most of the parents finished secondary school and were employees. Due to this, the application of these study findings to other schools should be done cautiously. The participants were 26 kindergarten students and consisted of boys and girls equally. Students' ages were between 4-5 years. The school was chosen by purposive sampling. The restriction of choosing a small group by purposive sampling was to investigate in-depth. However, the sample size in this study was 26 students (one classroom) which was small because the researcher could not conduct the program among many classrooms. The researcher had to teach young children, the evaluation involved complicated methods, and the researcher had to control the activities during implementation phase and lunch menu during lunch observation in order to evaluate the program. Furthermore, this school was chosen because a pilot study was previously conducted in this school. The environment of this

Copyright by Mahidol University

school was suitable for implementation of the research project and the school policy supported healthy eating habits for their students.

Discussion of the Results

1. Kinds of vegetables and fruit eaten by the students

The food experience program aimed to promote vegetable and fruit consumption among kindergarten students and could in fact, make a significant impact on children's vegetable-eating habits. The average of kinds of vegetables (from five kinds of vegetables: Chinese kale, Chinese white cabbage, Ivy gourd, Chinese cabbage, and pumpkin) significantly increased from 2.15 to 3.62 (p-value < 0.001). Moreover, the kinds of fruit eaten by the students increased from 3.35 to 3.54 (average from five kinds of fruits: rambutan, guava, ripe papaya, pineapple, and banana), but it was not significantly increased (p-value = 0.434). These results indicated that generally, children could eat many kinds of fruit more than vegetables because the sweet taste was perceived as a benefit of increased fruit-eating. Moreover, fruit was a convenient food because it can be served easily and has a variety of colors, smells, textures, and tastes. This finding confirms a report by Domel et al. (90) that children's preferences for fruit are higher than for vegetables.

The results demonstrated the impact of the food experience program to increase the kinds of vegetable and fruit consumption. The students had the opportunity to know and taste a variety of vegetables and fruit on many occasions during the intervention making them familiar with vegetables and fruit. These results are similar to the reports of Cullen et al. (91) which suggested that fruit and vegetable availability and accessibility influenced child dietary behavior, especially among girls. The exposure to vegetables and fruit might play an important role in establishing food preferences and selection. The study of Baranowski's group (81) also confirmed that food availability and accessibility was positively related to fruit and vegetable preferences and to vegetables and fruit-eating in children. These authors noted that children consumed more fruit and vegetables at schools where more fruit and vegetables were served, and they concluded that the extent to which fruit and

Copyright by Mahidol University

vegetables were available and accessible to children might shape children's attitudes towards those foods and related eating behaviors.

Another study on the availability of fruit and vegetables demonstrated the direct effect of motivation on the eating of fruit and vegetables (92). Increasing accessibility to and availability of vegetables and fruit were important predictive factors in children's fruit and vegetable-eating habits (92,93,94).

2. Amounts of vegetables and fruit eaten by the students

The average amounts of vegetable intake significantly increased after intervention ($p < 0.001$). In addition, it was found that students ate more fruit after intervention to a statistically significant level ($p = 0.001$). The average amounts (g) of vegetables before and after intervention were 10.94 g and 22.19 g, but these amounts were still much less than one serving (70 g) per meal. The average amounts (g) of fruit intake were 52.34 g and 76.71 g, which were equal to one serving per meal. The recommended amounts of vegetable and fruit servings for one day for 6-year-old children by the Nutrition Section, Ministry of Public Health (17) are two servings for vegetables (four rice spoon servings, one rice spoon serving ~ 40 g) and three servings for fruit [three (small fruit) / three slices (big fruit)]. The data from parents revealed that 62% of them prepared vegetables for their children everyday, 15% prepared four to five days/week, and 23% prepared only two to three days/week. Regarding fruit, it was found that only 50% of parents prepared them for their children everyday, 31% prepared four to five days/week, and 19% prepared only two to three days/week (these data are shown in Appendix D.). The results indicated that activities in the program such as sending a motivating letter about students' vegetable and fruit intake at school to parents encouraging them to prepare vegetables and fruit for their child at other mealtimes at home. The motivation encouraged parents to prepare various kinds of vegetables and fruit for their children every day and also recommended the number of servings. In a study by Gibson et al (95), mothers' nutritional knowledge, frequency of fruit consumption, and attitudes were important predictors of their children's fruit intake.

Copyright by Mahidol University

3. Scores of vegetable and fruit-eating behavior of the students

From lunch time observation (all five kinds of vegetables and fruit) of the students, it was found that the scores of eating behavior were significantly increased after intervention. The mean score of vegetable-eating behavior was 0.66 before intervention and 1.52 after intervention (p-value < 0.001). The score of fruit-eating behavior was also significantly different at p-value = 0.001, the mean scores were 1.23 and 1.66 at the beginning and after intervention, respectively. The results demonstrated the impact of the program to motivate vegetable and fruit-eating through many activities such as cartoons, tales, and songs to provide knowledge and develop attitudes that could motivate children to eat vegetables and fruit. From many studies (96, 97), it can be clearly seen that providing role models and increasing social support are successful components of prior nutrition interventions with children. Social support for eating fruit and vegetables given by family, teachers, and peers is a major factor to encourage vegetable and fruit-eating in elementary school children (98). Motivation with models have powerful effects on food selection; children always observe each other and are motivated by peer interaction to eat vegetables and fruit at lunch. Birch (81) found that when preschool children were given opportunities during meals to observe other children, they tried to eat vegetables served on their plate even though they did not like them. This method made children familiar with the taste of vegetables.

4. Observation in the intervention

4.1 In this study, the result of amounts of vegetable intake seemed that the students ate Chinese kale and Chinese white cabbage more than other vegetables. For fruits, the students ate rambutan papaya, pineapple, and banana very well. (These results are shown in Appendix D.) Thus, these vegetables and fruits should be prepared for children at school lunch and at home.

4.2 Tales and cartoons could provide knowledge and create positive attitudes relating to vegetable and fruit-eating behavior. For example, a symbolic model (the cartoon character Popeye) was favored by boys and Nid (a popular picture story character) could lead to creating positive attitudes among girls. From observation, the

Copyright by Mahidol University

boys always mentioned to Popeye, and the girls referred to Nid when they induced their friends to eat vegetables at lunch.

4.3 From observation, the children were very much interested in cooking and tasting the food that they prepared together. Feldman and Jean (99) suggested that cooking was more than making something delicious to eat; it was an ideal way to learn because it involved all five senses, and also, children learned that cooking is fun.

Moreover, Mack (45) suggested that food preparation and cooking were easily coordinated with other daily learning experiences and could be arranged in place of a regular activity. A variety of food preparation activities could be used to stimulate eye to hand coordination through the actions of measuring, pouring, cutting, stirring, beating, grating, and grinding. In addition, when children discussed about foods they learnt new words. They also learned to identify foods by name and color (45).

4.4 A "tasting party" was an enjoyable way for children to compare tastes of foods. The students could learn about the variety of textures, colors, and tastes of vegetables and fruit, such as carrot, rambutan, banana, and orange. This activity satisfied young children because of the various textures, tastes, and colors.

4.5 Several media such as cartoons, tales, puppet shows, color pictures and real foods were very interesting for children and could be excellent media for children's learning about vegetables and fruit as well as other related topics.

Furthermore, at lunch time during intervention the teacher ate with students in the classroom, so that it could serve as a model and build positive attitudes towards food for the children. From observation, the researcher found that the students also observed their teacher's eating behaviors. As Feldman and Jean (99) concluded, the teacher's attitudes about food will influence the children's attitudes. If teachers showed that they preferred fresh fruit and vegetables, the children would imitate these behaviors. If the teacher sat with the children and enjoyed the food served with them, the children would also enjoy the meal. On the other hand, a teacher's negative attitudes about certain foods could also be incorporated into the children's attitudes. Moreover, Beaty (49) also stated that children feel good when adults sit next to them at the table and eat the same food they do.

Copyright by Mahidol University

5. The report of the parents

From answering questionnaires by the parents after intervention about the changes of vegetable and fruit-eating behavior of the students at home revealed that the food experience program on promoting vegetable and fruit consumption among kindergarten children at school could make the students learn about the benefits of vegetable and fruit consumption. The results indicated that the children's perception of vegetable and fruit could be influenced by repeated exposure and by the food experience. The kindergarten children talked about vegetable-eating at school and they showed vegetable and fruit-eating at home. Thus, parents should provide ample opportunities in which children have the repeated experience of consuming vegetables and fruits. Parents can best encourage fruit and vegetable intake in their children by acting as role models of vegetable and fruit intake (86) and by preparing various kinds of vegetables and fruit for their children every day. In addition, the parents should provide social support for eating vegetables and fruit. It might be stated that this study suggested that food experiences at school and environment factors at home should work together to form attitudes about eating vegetables and fruit.

Copyright by Mahidol University

CHAPTER VI
CONCLUSION AND RECOMMENDATION

The primary objective of this study was to examine the effectiveness of the food experience program on promoting vegetable and fruit-eating behaviors among kindergarten children. The program target was Kindergarten students of Sukhothai School in Bangkok metropolitan area. One class of kindergarteners was purposively selected to be the samples of this study. A one group quasi-experimental design was used to examine children's vegetable and fruit-eating behavior before and after intervention. There were 26 children included in the study.

The program intervention consisted of food experience activities that promoted children to increase their consumption of vegetables and fruit. In this program, the researcher applied the concept of food experience combined with the Social Learning Theory to plan activities which were conducted during 8 consecutive weeks.

Children's vegetable and fruit consumption were determined by direct observation at lunchtime. In addition, the change of children's vegetable and fruit-eating behavior at home was determined by questionnaires completed by their parents, which were qualitative results. The kinds and amounts (g) of vegetable and fruit intake and the scores of eating behavior (averages from five kinds each for vegetables and fruit) were assessed before and after the intervention.

The statistical analyses, descriptive statistics containing mean, standard deviation, frequency and percent distribution were performed to describe general characteristics of the samples. The Wilcoxon's Signed Ranks Tests, statistical significance at an α level of $\leq .05$, were used to compare mean pretest and posttest for the kinds, amounts of vegetable and fruit intake, and scores of vegetable and fruit-eating behavior of the students.

Copyright by Mahidol University

The results revealed that the kindergarten children's vegetable consumption was significantly increased in all of the different kinds, in the amounts of vegetable intake, and in the scores of vegetable eating behavior (p-value < 0.05). For fruit consumption, their fruit intake was significantly increased in the amounts of fruit intake (p-value < 0.05) and in the scores of fruit eating behavior (p-value < 0.05) but the kinds of fruit intake was not significantly increased after the intervention.

It can be clearly concluded that this food experience program could increase vegetable and fruit consumption among kindergarten children.

Recommendations for application of Research Findings

Based on the research results, to implement the food experience program on promoting vegetable and fruit consumption among kindergarten children, considerable efforts were needed in order to develop the effective procedures for the program. It is recommended that:

1. Data about vegetable and fruit consumption of the students at home should focus on the kinds and amounts of vegetable and fruit intake to evaluate the program. These data should be analyzed and send to the parents.

2. The activities in the program were multi media such as the cartoon VCD, tale, hand puppet, song cassettes and charts which were interesting ,easily understandable and pleasant for kindergarten children. Furthermore, learning by cooking, planting, and doing art activity were stimulating to create their interest and enjoyment. Thus, these activities should be accommodated with nutrition education curriculum for kindergarten children.

3. To develop sustainable vegetable and fruit- eating behavior, the homeroom teachers and teacher who was responsible for school lunch should consider the importance of promoting on vegetable and fruit consumption among children and collaborate to plan the menu of school lunch which were contained of vegetables and fruit for children.

4. The teachers should be model for their students to create positive attitude of vegetable and fruit consumption.

5. Parents could be invited to observe snack or lunchtime occasionally that they would understand the experience their child was having. They should understand

Copyright by Mahidol University

the goals of the activities and the techniques used to foster those goals which were provided to their child. Lunch menus should be sent home regularly.

Recommendations for Further Research

The results of this study suggest some possible recommendations for further interventions and research as stated below.

1. Parental involvement programs are important for further research. For example, further research should train the parents by providing knowledge about recommended amounts of vegetable and fruit servings per day for their children and suggestions about giving social support for their children.

2. Further research should evaluate the intervention of the children's eating behavior at home by interviewing or conducting focus groups of parents both before and after the intervention to support the results from observation at school.

3. This study was a short term program that involved an intervention period of only 8 weeks; therefore, further research should be a long term study involving the integration of nutrition education curriculum to develop sustainable behaviors.

4. The research design lacked a comparable group; therefore, further studies should involve a research design to provide a control group for comparison.

5. In this study, the method utilized to evaluate the amounts of vegetable and fruit intake is complicated, so it is recommended to use an easier method to be used with a large sample size.

6. Further research needs to determine if peer and teacher influence programs would be useful in changing children's behaviors.

Copyright by Mahidol University

REFERENCES

1. Horn LV. Primary prevention of cardiovascular disease starts in childhood. J AM Diet Assoc 2000; 100:41-2.
2. อารี วัลยะเสวี. ปัญหาโภชนาการในเด็ก. ใน: วันดี วราวิทย์, ประพุทธ ศิริปุณย์, สุรางค์ เจียมจรรยา, บรรณาธิการ. กุมารเวชศาสตร์ 3. พิมพ์ครั้งที่1. กรุงเทพฯ: โฮลิสติก; 2541. หน้า 144-74.
3. วงสวาท โกศัลวัฒน์. สถานการณ์ของปัญหาโรคไม่ติดต่อในประเทศกำลังพัฒนา. ใน: ทรงศักดิ์ ศรีอนุชาต, ชนิพรรณ บุตรยี่, บรรณาธิการ. การประชุมวิชาการโภชนาการ'44: อาหารและโภชนาการเพื่อการสร้างเสริมสุขภาพ (Food and nutrition for health promotion); วันที่ 21-23 มกราคม พ.ศ. 2545; โรงแรมมิราเคิล แกรนด์ คอนเวนชั่น กรุงเทพฯ; 2545. หน้า 63-7.
4. Heimendinger J, Van Dugn AMS. Dietary behavior change: the challenge of recasting the role of fruit and vegetables in the American diet. Am J Clin Nutr 1995;(61Suppl):1397S-401S.
5. Winston JC. Phytochemicals: Guardians of our health. J Am Diet Assoc 1997; (97Suppl):199S-204S.
6. Kushi LH, Lenart EB, Willett WC. Health implication of Mediterranean diets in light of contemporary knowledge 1. Plant foods and dairy products. J Am Diet Assoc 1997; (97Suppl): 1407S-15S.
7. Tavani A, Vesshai CL.Fruit and vegtable consumption and cancer risk on a Mediterranean population. Am J Clin Nytr 1995;(61Suppl):1374S-7S.
8. Kolonel LN , Hankin JH, Whittmore AS, et al. Vegetables, fruits, legumes, and prostate cancer : a multiethnic case – control study. Cancer Epidemiol Bomarkers Prev 2000;9:795.
9. Dteinmetz KA, Potter JD. Vegetables. Fruit, and cancer prevention : a review. J AM Diet Assoc 1996;96:1027.
10. Van't Veer P , Janden MC, Klerk M, Kok FJ. Fruits and vegetables in the prevention of cancer and cardiovascular disease. Public Health Nutr 2000;3:103.

Copyright by Mahidol University

11. La Vecchia C, Tavani A. Fruit and vegetables, and human cancer. Eur J Cancer Prev 1998;7:3.

12. Ness AR, Powles JW. Fruit and vegetables, and cardiovascular disease: a review int J Epidemiol 1997;26:1.

13. Trudeau E, Kristal AR, Li S, Patterson RE. Demographic and psychosocial predictors of fruit and vegetable intakes differ: Implications for dietary interventions. J Am Diet Assoc 1998;98:1472-7.

14. Van Duyn AMS,Pivonka E. Overview of the health benefits of fruit and vegetable consumption for the dietetics professional:Selected literatuer. J AM Diet Assoc 2000;100:1511-21.

15. Havas S, Heimendinger J, Reynolds K, et al. 5 A Day for Better Health: a new research initiative. J Am Diet Assoc 1994;94:32.

16. Buttrum RR, Clifford CK, Lanza E. NCI dietary guidelines: rationale. Am J Clin Nutr 1988;48:888-95.

17. กองโภชนาการ กรมอนามัย กระทรวงสาธารณสุข. คู่มือกินพอดีสุขีทั่วไทย. พิมพ์ครั้งที่ 1 องค์การสงเคราะห์ทหารผ่านศึก. 2542.

18. กองโภชนาการ กรมอนามัย กระทรวงสาธารณสุข. รายงานการสำรวจอาหาร และภาวะโภชนาการของประเทศไทย ประจำปี 2542. องค์การสงเคราะห์ทหารผ่านศึก; 2542. หน้า 136.

19. จันทร์เพ็ญ แซ่น้ำ. แบบแผนและคุณค่าทางโภชนาการของอาหารบริโภคของนักเรียนในโรงเรียนสังกัดกรุงเทพมหานคร ในปี 2528 และ 2538. [วิทยานิพนธ์ปริญญาวิทยาศาสตรมหาบัณฑิต(สาธารณสุขศาสตร์)สาขาวิชาเอกโภชนวิทยา]. กรุงเทพฯ: บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล; 2540.

20. Chaosap T. Psychosocial and sensory factors associated with fruit and vegetable consumption among adolescents in Khonkaen Province. A thesis submitted in partial fulfillment of the requirements for the degree of master of Science (Public Health) Major in Nutrition Faculty of graduate studies Mahidol University. 2002.

Copyright by Mahidol University

21. Singer MR, Moore LL, Garrahie EJ, Ellison RC. The tracking of nutrient intake in young children: the Framingham Children's Study. Am J Public Health 1995;85:1673-7.
22. Lytle LA, Eldridge AL, Kotz K, Piper J, Williams S, Kalina B. Children's interpretation of nutrition messages. J Nutr Educ 1997;29:128-36.
23. Berenson GS, Srinivasan SR, Webber LS. Cardiovascular risk prevention in children: a challenge or a poor idea? Nutr Metab Cardiovasc Dis 1994;4:46-52.
24. Freedman DS, Dietz WH, Srinivasan SR, Berenson Gs. The relation of overweight to cardiovascular risk factors among children and adolescents: The Bogalusa Heart Study. Pediatrics. 1999;103:1175-82.
25. Nicklas TA, Webber LS, Johnson CC, Srinivasan SR, Berenson GS. Foundations for health promotion with youth: a review of observations from the Bogalusa Heart Study. J Health Educ 1995;26(2suppl):S18-S26.
26. Bandura A. Social Foundation of Thought and Action: A Social Cognitive Theory. Englewood Cliff, NJ: Prentice Hall; 1986.
27. Green LW, Kreuter MW. Behavioral and environmental diagnosis. In: Health Promotion Planning: An Educational and Ecological Approach. Mountain view. Calif: Mayfield Publishing; 1999: 125-49.
28. Kelder SH, Perry CL, Klepp KI, Lytle LL. Longitudinal tracking of adolescent smoking, physical activity, and food choice behaviors. Am J Public Health 1994;84:1121-6.
29. Devine CM, Connors M, Bisogni CA, Sobal J. Life-course influences on fruit and vegetable trajectories: Qualitative analysis of choices. J Nutr Educ 1998;30:361-70.
30. Birch LL, Fisher JO. Appetite and eating behavior in children. Pediatric Clin North Am 1995;42:931-53.
31. Fisher JA, Birch LL. 3-5 Year-old children's fat preferences and fat consumption are related to parental adiposity. J Am Diet Assoc 1995;95:759-64.

Copyright by Mahidol University

32. Domel SB, Thomson WO, Davis HC, Baranowski T, Leonard SB, Baranowski J. Psychosocial predictors of fruit and vegetable consumption among elementary school children. Health Educ Res 1996;11:299-308.

33. Birch LL. Dimensions of preschool children's food preferences. J Nutr Educ 1979;11:77-80.

34. Birch LL. Preschool children's food preferences and consumption patterns. J Nutr Educ 1979;11:189-92.

35. Domel SB, Baranowski T, Davis H, Leonard SB, Riley P, Baranowski J. Measuring fruit and vegetable preferences among 4th and 5th grade students. Prev Med 1993;22:866-79.

36. สว่างจิต คูหิรัญญรัตน์. ปัจจัยที่มีอิทธิพลต่อภาวะโภชนาการในเด็กวัยก่อนเรียน(1-5 ปี) ศึกษาเฉพาะกรณี อำเภอนางรอง จังหวัดบุรีรัมย์ [วิทยานิพนธ์ปริญญาวิทยาศาสตรมหาบัณฑิต สาขาชีวสถิติ]. กรุงเทพฯ: บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล; 2536.

37. เยาวนี วงศ์ศิริ. การปรับพฤติกรรมการกินของเด็กวัยก่อนเรียนโดยใช้หลักการมีส่วนร่วมของผู้ปกครอง. [วิทยานิพนธ์ปริญญาวิทยาศาสตรมหาบัณฑิต(สาธารณสุขศาสตร์)สาขาวิชาเอกสุขศึกษา]. กรุงเทพฯ: บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล; 2535.

38. นันทิยา เกิดวิชัย. ความสัมพันธ์ระหว่างบริโภคนิสัยกับภาวะโภชนาการของเด็กวัยก่อนเรียนในโรงเรียนสังกัดสำนักงานคณะกรรมการการประถมศึกษาแห่งชาติ เขตการศึกษา 11 [วิทยานิพนธ์ปริญญาครุศาสตรมหาบัณฑิต สาขาวิชาการศึกษาปฐมวัย]. กรุงเทพฯ: บัณฑิตวิทยาลัย มหาวิทยาลัยจุฬาลงกรณ์; 2532.

39. พิษณุ อุตมะเวทิน และคณะ. พฤติกรรมการบริโภคขนมของเด็กภาคตะวันออกเฉียงเหนือ. ขอนแก่น: ภาควิชาโภชนวิทยา คณะสาธารณสุขศาสตร์ มหาวิทยาลัยขอนแก่น; 2535.

40. Connors P, Bednar C, Klammer S. Carfeteria factor that influence milk-drinking behaviors of elementary school children: Grounded theory approach. J Nutr Educ 2001;33:31-6.

41. Birch LL. Children's preferences for high-fat foods. Nutrition Reviews. 1992;50:249-55.

42. จริยาวัตร คมพยัคฆ์. สภาวะโภชนาการและบริโภคนิสัยของเด็กวัยก่อนเรียน เขตบางกอกน้อย กรุงเทพมหานคร. [วิทยานิพนธ์ปริญญาพยาบาลศาสตรมหาบัณฑิต]. กรุงเทพฯ: บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล; 2526.

Copyright by Mahidol University

43. Position statement of The American Dietetic Association: Dietary guidance for health children age 2 to 11 years. J Am Diet Assoc 1999;99:93-101.
44. Birch LL. Development of food preferences. Ann Rev Nutr 1999;19:41-62.
45. Mack J. Early Childhood Development and Education. Canada: Delmar Publishers; 1975:146-54.
46. Feeney A. Who Am I in the Lives Children? 3rd ed. Ohio: Merrill Publishing; 1986.
47. พนมพร ศิริถาพร ผลของโครงการประสบการณ์เกี่ยวกับอาหารที่มีต่อพฤติกรรมในการรับประทานอาหารของเด็กวัยอนุบาล [วิทยานิพนธ์ปริญญาครุศาสตรมหาบัณฑิต สาขาวิชาการประถมศึกษา]. กรุงเทพฯ: บัณฑิตวิทยาลัย มหาวิทยาลัยจุฬาลงกรณ์; 2538.
48. Hilderbrand V. Introduction to Early Childhood Education. 6th ed. New York: Macmillan Publishing; 1997:441-64.
49. Beaty, Janice J. Skills for Preschool Teachers. 2nd ed. Ohio: Merrill Publishing; 1996:33-6.
50. Trabms CM. Nutrition in childhood. In. Worthington-Roberts BS,Williams SR, editors. Nutrition throughout the life cycle. 4th ed. Boston: McGraw-Hill; 2000. p.220-68.
52. Kirby SD, Baranowski T, Reynolds KD, Taylor G, Binkley D. Children's fruit and vegetable intake: Socioeconomic, adult-child, region, and urban-rural influences. J Nutr Educ 1995;27:261-71.
53. Bandura A. Social foundation of thought: a social cognitive model. Englewood Cliffs. NJ: Prentice Hall; 1986.
54. Bender AE. "Fruits and Vegetables" Encycopedia of Human Nutrtion. Volume 2. Sadler MJ, Strain JJ, Caballero B, Editors. UK: The Bath Press; 1999:902-6.
55. เสาวนีย์ จักรพิทักษ์. หลักโภชนาการปัจจุบัน. พิมพ์ครั้งที่ 9. กรุงเทพมหานคร: โรงพิมพ์ ไทยวัฒนาพานิช; 2542.
56. World Cancer Research Fund. (American Institute for Cancer Research): Food Nutrition and the Prevention of Cancer: A Global Perspective. Washington. DC, American Institute for Cancer Research; 1997:436-40.

Copyright by Mahidol University

57. Bloch A, Thomson CA. Position of The American Dietetic Association: phytochemicals and functional foods. J Am Diet Assoc 1995;95:493-6.

58. Whitney EN, Rolfes SR. Understanding Nutrition. 9th ed. USA: Wadworth/ Thomson Learning; 2002:547.

59. D.K. Salunkhe, S.S. Kadam, Handbook of Fruit Science and Technology. New York: Marcel Dekker, Inc; 1995.

60. Drummond KE. Nutrition for Foodservice and Culinary Professionals. 5th ed. New Jersey: John Wiley & Sons, Inc; 2004:397-9.

61. กระยาทิพย์ เรือนใจ บรรณาธิการ ผลไม้คุณค่านานาเพื่อสุขภาพ พิมพ์ครั้งที่ 1 กรุงเทพฯ : ต้นธรรม; 2543.

62. Jenny Matthew. Institute of food research. United Kingdom: Norwich; 2000.

63. Kohlmeier L, Hastings SB. Epidemiologic evidence of a role of carotenoids in cardiovascular disease prevention. Am J Clin Nutr 1995;(62Suppl): 1370S-6S.

64. Van Poppel G, Goldbohm RA. Epidemiologic evidence for betacarotene and cancer prevention. Am J Clin Nutr 1995;(62Suppl):1393S-402S.

65. Bloch A, Thomson CA. Position of The American Dietetic Association: phytochemicals and functional foods. J Am Diet Assoc 1995;95:493-6.

66. Tavani A, Vecchia CL, Fruit and vegetable consumption and cancer risk in a Maditeranean population. Am J Clin Nutr 1995;(61Suppl):1374S-7S.

67. World Health Organization. Diet, Nutrition and The Prevention of Chronic Diseases. Geneva; 2003:61-101.

68. Wolf Am. What is the economic cost for treating obesity?. Obesity Res 1998;(6Suppl):2S-7S.

69. Framz MJ. Managing obesity in patients with comorbidities. J Am Diet Assoc 1998;98:39-43.

70. Zino S, Skeaff M, Williams S, Mann J. Randomized controlled trial of effect of fruit and vegetable consumption on plasma concentrations of lipids and antioxidants. BMJ 1997;314:1787-91.

Copyright by Mahidol University

71. Ziegier RG. Vegetables, fruits, and carotenoids and the risk of cancer. Am J Clin Nutr 1991;(53Suppl):251S-9S.

72. Stockley L. “Dietary Guidelines” Encycopedia of Human Nutrtion. Volume 2. Sadler MJ, Strain JJ, Caballero B, Editors. UK: The Bath Press; 1999:557-64.

73. Winston JC. Phytochemicals: Guardians of our health. J Am Diet Assoc 1997;(97Suppl):199S-204S.

74. กองโภชนาการ กรมอนามัย กระทรวงสาธารณสุข. ตำรับอาหารเด็กวัยก่อนเรียน อายุ 1-6 ปี. พิมพ์ครั้งที่ 2 กรุงเทพฯ: โรงพิมพ์องค์การสงเคราะห์ทหารผ่านศึก; 2543.

75. กองโภชนาการ กรมอนามัย กระทรวงสาธารณสุข. ตารางแสดงคุณค่าทางโภชนาการของอาหารไทย. กรุงเทพฯ: โรงพิมพ์องค์การสงเคราะห์ทหารผ่านศึก; 2544.

76. Morrison GS. Early childhood education today. 4th ed. Columbus: Merrill Publishing Company; 1988:220-3.

77. Williams SR. Essentials of Nutrition and Diet Therapy. 7th ed. California: Von Hoffmann Press; 1999:263-4.

78. Ormrod JE. Human learning. 2nd edition. New Jersey: A Simon & Schuster Company; 1995:130-60.

79. Bandura A. Self-Efficacy the exercise of Control. New York: W.H. Freeman and Company; 1997.

80. Swadener SS. Nutrition education for preschool children. J Nutr Educ 1995;27:291-7.

81. Birch LL, Fisher JO. Development of eating behaviors among children and adolescents. Pediatrics. 1998;101:539-49.

82. Lytle LA, Kelder SH, Perry CL, Klepp K-I. Covariance of adolescent health behaviors: the class of 1989 study. Health Educ Res 1995;10:133-46.

83. Fuhr JE, Barclay KH. The importance of appropriate nutrition and nutrition education. Young Child. 1998;Jan:74-9.

84. Nahikian-Nelms ML. Influential factors of caregiver behavior at mealtime: a study of 24 child-care programs. J Am Diet Assoc 1997;97:505-9.

85. Nahikian-Nelms ML, Syler G, Mogharreban CN. Pilot assessment of nutrition practices in a university child care program. J Nutr Educ 1994;26:238-40.

Copyright by Mahidol University

86. Fisher JO, Mitchell DC, Wright HS, Birch LL. Parental influences on young girls'fruit and vegetable, micronutrient, and fat intakes. J Am Diet Assoc 2002;102:58-64.

87. Dteinmetz KA, Potter JD. Vegetables. Fruit, and cancer prevention : a review. J AM Diet Assoc 1996;96:1027.

88. Lawatsch DE. A comparison of two teaching strategies on nutrition knowledge, attitudes and food behavior of preschool children. J Nutr Educ 1990;22:117-22.

89. Cason KL. Evaluation of a preschool nutrition education program based on the theory of multiple intelligences. J Nutr Educ 2001;33:161-4.

90. Domel SB, Baranowski T, Davis H, Leonard SB, Riley P, Baranoski J. Measuring fruit and vegetable preferences among 4th-and 5th –grade students. Prev Med 1993;22:866-79.

91. Cullen KW, Baranowski T, Owens E, Marsh T, Rittenberry L, Moor C de. A viability, accessibility, and preferences for fruit, 100% fruit juice, and vegetables influence children's dietary behavior. Health Education & Behavior. 2003;30(5):615-26.

92. Reynold KD, Hinton AW, Shewchuk RM, Hickey CA. Social cognitive model of fruit and vegetable consumption in elementary school children. J Nutr Educ 1999;31:23-30.

93. Hearn MD, Baranoski T, Baranoski J, et al: Environmental influence3s on dietary behavior among children: Availability and accessibility of fruits and vegetables enable consumption. J Health Educ 1998;19:26-32.

94. Cullen KW, Eagan J, Baranowski T, et al: Effect of a la carte and snack bar foods at school on children's lunchtime intake of fruits and vegetables. J Am Diet Assoc 2000;100:1482-6.

95. Gibson EL, Wardle J, Watts CJ. Fruit and vegetable consumption, nutritional knowledge and believes in mothers and children. Appetite.1998;31: 205-28.

Copyright by Mahidol University

96. Perry CL, Bishop DB, Taylor GL, Murray DM, Mays RW, Dudovitz BS, Smyth M, Story M: Changing fruit and vegetable consumption among children: The 5-A-Day Power Plus Program in Saint Paul, Minnesota. Am J Public Health 1998;88(4):603-9.

97. Perry CL, Bishop DB, Taylor GL. A randomized school trial environmental strategies to encourage fruit and vegetable consumption among children. Health Education & Behavior. 2004;31(1):65-76.

98. Corwin SJ, Sargent RG, Rheaume CE, Saunders RP. Dietary behaviors among fourth graders: a social cognitive theory study approach Am J Health Behav 1999;23:182-97.

99. Feldman JR. A survival guide for the preschool teacher. United States of America; 1991:239-41.

Copyright by Mahidol University

APPENDIX

Copyright by Mahidol University

APPENDIX A

Ethics

No. 154/2003

Documentary Proof of Ethical Clearance

The Committee on Human Rights Related to

Human Experimentation

Mahidol University, Bangkok

.....

Title of Project: The Effectiveness of Food Experience Program on Promoting Fruit and Vegetable Consumption among Kindergarten Children

Principal Investigator: Miss Kingkhan Iedsee

Name of Institution: Faculty of Public Health

Approved by the Committee on Human Rights Related to Human Experimentation

Signature of Chairman: _____

(Professor Dr. Srisin Khusmith)

Signature of Head of Institute: _____

(Professor Dr. Pornchai Matangkasombut)

Date of Approval: 5 SEP 2003

Copyright by Mahidol University

APPENDIX B

Questionnaires

Observational record form

แบบสอบถามผู้ปกครองของนักเรียน
เกี่ยวกับการส่งเสริมการบริโภคผักและผลไม้ของนักเรียนอนุบาล
การวิจัยเรื่อง "ประสิทธิผลของการส่งเสริมการบริโภคผักและผลไม้ในเด็กอนุบาล
โดยการจัดประสบการณ์เกี่ยวกับอาหาร"

เรียน ผู้ปกครองของ ดช. / ดญ. .....
ชั้นอนุบาล...../..... โรงเรียน.....

ผู้ตอบแบบสอบถามชื่อ (นาย / นาง)..... นามสกุล.....
เกี่ยวข้องกับเด็กโดยเป็น.....ของเด็ก
อายุ ..... ปี

ตอนที่ 1

ข้อมูลทั่วไป มี 2 ส่วน

ส่วนที่ 1 ข้อมูลเกี่ยวกับครอบครัว

โปรดเติมคำในช่องว่าง (.....) และกาเครื่องหมาย √ ในสี่เหลี่ยม □ ข้อที่ท่านว่าตรงกับความเป็นจริงที่สุด

1. บิดานักเรียนอายุ.....ปี
2. มารดานักเรียนอายุ.....ปี
3. บิดานับถือศาสนา

□ 1. พุทธ □ 2. คริสต์
□ 3. อิสลาม □ 4. อื่นๆ โปรดระบุ.....

Copyright by Mahidol University

4. มารดานับถือศาสนา

☐ 1. พุทธ ☐ 2. คริสต์

☐ 3. อิสลาม ☐ 4. อื่นๆ โปรดระบุ.....

5. สถานภาพสมรส

☐ 1. คู่ ☐ 2. หย่า / แยกกันอยู่

☐ 3. หม้าย ☐ 4. อื่นๆ โปรดระบุ.....

6. การศึกษาของบิดา

☐ 1. ประถมศึกษา

☐ 2. มัธยมศึกษา

☐ 3. อนุปริญญา / ปวช. / ปวส.

☐ 4. ปริญญาตรี

☐ 5. สูงกว่าปริญญาตรี

7. การศึกษาของมารดา

☐ 1. ประถมศึกษา

☐ 2. มัธยมศึกษา

☐ 3. อนุปริญญา / ปวช. / ปวส.

☐ 4. ปริญญาตรี

☐ 5. สูงกว่าปริญญาตรี

8. อาชีพของบิดา

☐ 1. รับราชการ

☐ 2. รัฐวิสาหกิจ

☐ 3. ค้าขาย

☐ 4. รับจ้าง

☐ 5. อื่นๆ โปรดระบุ.....

9. อาชีพของมารดา

☐ 1. รับราชการ

☐ 2. รัฐวิสาหกิจ

☐ 3. ค้าขาย

☐ 4. รับจ้าง

☐ 5. แม่บ้าน

☐ 6. อื่นๆ โปรดระบุ.....

10. รายได้ของครอบครัวต่อเดือน ประมาณ (โปรดระบุ).....บาท

11. ลักษณะของครอบครัว

☐ 1. เป็นครอบครัวที่มีพ่อแม่ลูกอยู่ด้วยกัน

☐ 2. เป็นครอบครัวที่มีพ่อแม่ลูกและญาติอยู่ด้วยกัน (เช่น ปู่ / ย่า / ตา / ยาย)

☐ 3. อื่นๆ โปรดระบุ.....

12. จำนวนสมาชิกในครอบครัว.....คน

13. ใครเป็นผู้ดูแลจัดหาอาหารให้นักเรียนเป็นประจำ

☐ 1. บิดา ☐ 2. มารดา

☐ 3. ย่า / ยาย ☐ 4. คนอื่นๆ โปรดระบุ.....

Copyright by Mahidol University

14. ผู้ดูแลจัดหาอาหารให้เด็ก

☐ 1. ทำงานอยู่ที่บ้าน ☐ 2. ทำงานนอกบ้าน

☐ 3. อื่นๆ โปรดระบุ.....

15. ลักษณะการได้มาซึ่งอาหารให้นักเรียนบริโภค

☐ 1. ซื้ออาหารสดมาปรุงเอง ☐ 2. ไปรับประทานตามร้านอาหาร

☐ 3. ซื้ออาหารสำเร็จรูป / ผูกปิ่นโต ☐ 4. อื่นๆ ระบุ.....

ส่วนที่ 2 ข้อมูลเกี่ยวกับนักเรียน

โปรดเติมคำในช่องว่าง (.....) และกาเครื่องหมาย √ ในสี่เหลี่ยม ☐ ข้อที่ท่านเห็นว่าตรงกับความเป็นจริงที่สุด

1. นักเรียนเป็นบุตรคนที่.....ในจำนวนพี่น้อง.....คน
   เป็นชาย.....คน เป็นหญิง.....คน
2. น้ำหนักแรกเกิดของนักเรียน.....กรัม
3. ปกตินักเรียนถ่ายอุจจาระบ่อยแค่ไหน

☐ 1. ถ่ายทุกวัน ☐ 2. ถ่ายวันเว้นวัน

☐ 3. 2-3 วันถ่ายครั้ง ☐ 4. มากว่า 3 วัน จึงจะถ่าย

☐ 5. อื่นๆ โปรดระบุ.....

4. นักเรียนเป็นหวัดบ่อยแค่ไหนในช่วง 6 เดือนที่ผ่านมา

☐ 1. เดือนละครั้ง ☐ 2. 2-3 เดือนครั้ง

☐ 3. ปีละครั้ง ☐ 4. อื่นๆ โปรดระบุ.....

5. รายการอาหารที่นักเรียนชอบรับประทานเป็นประจำ คือ.....
6. ลักษณะการรับประทานอาหารของนักเรียน

☐ 1. รับประทานได้เอง ☐ 2. ต้องมีคนป้อนให้

☐ 3. รับประทานเองด้วย ต้องป้อนด้วย ☐ 4. อื่นๆ โปรดระบุ.....

Copyright by Mahidol University

ส่วนที่ 3 แบบสอบถามเกี่ยวกับพฤติกรรมการบริโภคผักและผลไม้ของครอบครัว

โปรดเติมคำในช่องว่าง (.....) และกาเครื่องหมาย √ ในสี่เหลี่ยม □ ข้อที่ท่านเห็นว่าตรงกับความเป็นจริงที่สุด

1. สมาชิกในครอบครัวของท่านมีใครบ้างที่ไม่รับประทานผักเลย (ตอบได้มากกว่า 1 ข้อ)

□ 1. ไม่มี □ 2. ตัวเด็กเอง □ 3. พี่ของเด็ก □ 4. บิดาของเด็ก

□ 5. มารดาของเด็ก □ 6. คนอื่นๆ ในครอบครัวระบุ.....

2. ครอบครัวท่านจัดอาหารที่มีผักรับประทานบ่อยแค่ไหน

□ 1. ไม่รับประทานเลย □ 2. 2-3 วันต่อสัปดาห์

□ 3. 4-5 วันต่อสัปดาห์ □ 4. ทุกวัน

3. ส่วนใหญ่จัดอาหารที่มีผักรับประทานในมื้อใด เพราะอะไร.....

4. ครอบครัวท่านรับประทานผลไม้บ่อยแค่ไหน

□ 1. ไม่รับประทานเลย □ 2. 2-3 วันต่อสัปดาห์

□ 3. 4-5 วันต่อสัปดาห์ □ 4. ทุกวัน

5. ส่วนใหญ่รับประทานผลไม้ในมื้อใด เพราะอะไร.....

Copyright by Mahidol University

6. ผักชนิดใดบ้าง ดังต่อไปนี้ ที่ท่านซื้อมารับประทานที่บ้านเป็นประจำ (ตอบได้มากกว่า 1 ข้อ)

☐ 1. ผักกาดขาว
☐ 2. ผักกาดหอม
☐ 3. ผักบุ้งแดง
☐ 4. ผักบุ้งจีน
☐ 5. ผักแว่น
☐ 6. ผักกาดเขียว
☐ 7. สายบัว
☐ 8. ผักปวยเล้ง
☐ 9. ยอดฟักทองอ่อน
☐ 10. ผักกาดขาว
☐ 11. ผักกาดหอม
☐ 12. ผักบุ้งแดง
☐ 13. ใบโหรพา
☐ 14. กะหล่ำปลี
☐ 15. ดอกกะหล่ำ
☐ 16. คื่นฉ่าย
☐ 17. มะเขือเทศ
☐ 18. มะเขือเปราะ
☐ 19. แตงกวา
☐ 20. ฟักเขียว
☐ 21. บวบ
☐ 22. คูณ
☐ 23. ตั้งโอ๋
☐ 24. หยวกกล้วยอ่อน
☐ 25. ฟักทอง
☐ 26. หอมหัวใหญ่
☐ 27. ถั่วงอก
☐ 28. ถั่วงอกหัวโต
☐ 29. ถั่วฝักยาว
☐ 30. ถั่วพู
☐ 31. ถั่วลันเตา
☐ 32. ถั่วแขก
☐ 33. ผักกวางตุ้ง
☐ 34. ผักโขม
☐ 35. ผักคะน้า
☐ 36. ผักกะเฉด
☐ 37. ผักตำลึง
☐ 38. ผักหวาน
☐ 39. แครอท
☐ 40. บรอคโคลี่
☐ 41. ข้าวโพดอ่อน
☐ 42. ดอกขจร
☐ 43. เห็ดนางฟ้า
☐ 44. เห็ดฟาง
☐ 45. เห็ดหูหนู
☐ 46. หน่อไม้
☐ 47. หน่อไม้ฝรั่ง
☐ 48. หัวปลี
☐ 49. หัวผักกาด
☐ 50. มะระจีน
☐ 51. มะละกอดิบ
☐ 52. สะตอ
☐ 53. ยอดชะอม
☐ 54. ยอดกระถิน
☐ 55. ชะพลู
☐ 56. ใบยอ
☐ 57. กุยช่ายใบ/ดอก
☐ 58. ต้นหอม
☐ 59. ต้นกระเทียม
☐ 60. พริกหวาน
☐ 61. อื่นๆ โปรดระบุ.....

Copyright by Mahidol University

7. ผลไม้ชนิดใดบ้าง ดังต่อไปนี้ ที่ท่านซื้อรับประทานที่บ้านเป็นประจำ (ตอบได้มากกว่า 1 ข้อ)

☐ 1. กล้วยน้ำว้า
☐ 2. กล้วยไข่
☐ 3. กล้วยหอม
☐ 4. กล้วยหักมุก
☐ 5. ขนุน
☐ 6. แคนตาลูป
☐ 7. เงาะ
☐ 8. ชมพู่
☐ 9. แตงไทย
☐ 10. แตงโม
☐ 11. ทุเรียน
☐ 12. น้อยหน่า
☐ 13. พุทรา
☐ 14. มะปราง
☐ 15. มะละกอสุก
☐ 16. มะม่วงดิบ
☐ 17. มะม่วงสุก
☐ 18. มะขามหวาน
☐ 19. ละมุด
☐ 20. ลางสาด
☐ 21. ลำไย
☐ 22. ลิ้นจี่
☐ 23. ลูกพลับ
☐ 24. ลูกเกด
☐ 25. สะละ
☐ 26. สาลี่
☐ 27. ส้ม
☐ 28. ส้มโอ
☐ 29. สับปะรด
☐ 30. สตรอเบอรี่
☐ 31. องุ่น
☐ 32. แอปเปิ้ล
☐ 33. มังคุด
☐ 34. อื่นๆ โปรดระบุ.....

Copyright by Mahidol University

ตอนที่ 2

การส่งเสริมการบริโภคผักและผลไม้ในเด็กวัยอนุบาลของผู้ปกครอง

คำชี้แจง กาเครื่องหมาย √ ในช่องสี่เหลี่ยม ☐ ที่ท่านเห็นว่าตรงกับความเป็นจริงที่สุด

1. ท่านเตรียมอาหารที่มีผักเป็นส่วนประกอบให้บุตรบ่อยแค่ไหน

☐ 1. ไม่เคย ☐ 2. 2-3 วันต่อสัปดาห์

☐ 3. 4-5 วันต่อสัปดาห์ ☐ 4. ทุกวัน

2. ท่านมักเตรียมอาหารที่มีผักเป็นส่วนประกอบให้บุตรในมื้อใด (ตอบได้มากกว่า 1 ข้อ)

☐ 1. ไม่เคย ☐ 2. มื้อเช้า ☐ 3. มื้อเที่ยง

☐ 4. มื้อเย็น ☐ 5. ทุกมื้อ

เหตุผล.....

3. ท่านเตรียมผลไม้ให้บุตรในมื้อใด (ตอบได้มากกว่า 1 ข้อ)

☐ 1. ไม่เคย ☐ 2. มื้อเช้า ☐ 3. มื้อเที่ยง

☐ 4. มื้อเย็น ☐ 5. มื้ออาหารว่าง ☐ 6. ทุกมื้อ

☐ 7.อื่นๆ ระบุ.....

4. เมื่อท่านต้องการให้เด็กรับประทานผัก ท่านเคยเตรียมอาหารที่มีผักเป็นส่วนประกอบโดยวิธีเหล่านี้หรือไม่ (ตอบได้มากกว่า 1 ข้อ)

4.1 หั่นผักเป็นชิ้นเล็กๆ ใส่ในข้าวผัด หรือใส่ในอาหารอื่นให้เด็ก ☐ 1. เคย ☐ 2. ไม่เคย

4.2 นำผักมาชุบแป้งทอดให้เด็ก ☐ 1. เคย ☐ 2. ไม่เคย

4.3 นำผักที่มีสีสันสวยงามชวนรับประทานมาประกอบอาหารให้เด็ก ☐ 1. เคย ☐ 2. ไม่เคย

4.4 เตรียมอาหารให้เด็ก โดยใส่ในภาชนะที่เด็กชอบ ☐ 1. เคย ☐ 2. ไม่เคย

4.5 ให้เด็กช่วยเตรียมอาหารด้วย เพื่อให้เด็กคุ้นเคยกับผัก ☐ 1. เคย ☐ 2. ไม่เคย

5. ท่านได้ชักชวน / แนะนำให้บุตรของท่านรับประทานผักและผลไม้ในแต่ละวันหรือไม่

☐ 1. ไม่เคย ☐ 2. เคยนานๆ ครั้ง ☐ 3. ชักชวน / แนะนำเป็นประจำ

6. ท่านได้กล่าวชมเชยหรือให้รางวัลเมื่อลูกรับประทานผักหรือไม่

☐ 1. ไม่เคย ☐ 2. เคยนานๆ ครั้ง ☐ 3. เป็นประจำ

7. ท่านได้กล่าวชมเชยหรือให้รางวัลเมื่อลูกรับประทานผลไม้หรือไม่

☐ 1. ไม่เคย ☐ 2. เคยนานๆ ครั้ง ☐ 3. เป็นประจำ

Copyright by Mahidol University

8. ท่านทำอย่างไรเมื่อบุตรของท่านไม่ยอมรับประทานผัก

☐ 1. ตามใจ ไม่ทานก็ให้ทานอย่างอื่น ☐ 2. คะยั้นคะยอให้ทาน

☐ 3. บังคับให้ทาน ☐ 4. หลอกล่อด้วยรางวัล

รางวัลที่ให้มักเป็น โปรดระบุ.....

9. ที่บ้านท่านหรือบ้านญาติมีการปลูกผัก หรือปลูกผลไม้ หรือไม่

☐ 1. มี ☐ 2. ไม่มี

ถ้ามีเป็นลักษณะใด

☐ 1. ที่บ้านปลูกผักสวนครัว ชนิดผักที่ปลูกโปรดระบุ

☐ 2. ที่บ้านเป็นบ้านสวน มีสวนผักขนาดใหญ่ ชนิดผักที่ปลูกโปรดระบุ.....

☐ 3. มีบ้านญาติเป็นบ้านสวนมีสวนผักขนาดใหญ่ ชนิดผักที่ปลูกโปรดระบุ

☐ 4. ที่บ้านปลูกผลไม้ในบริเวณบ้าน ชนิดผลไม้ที่ปลูกโปรดระบุ

☐ 5. ที่บ้านเป็นบ้านสวน มีสวนผลไม้ขนาดใหญ่ ชนิดผลไม้ที่ปลูกโปรดระบุ

☐ 6. มีบ้านญาติเป็นบ้านสวน มีสวนผลไม้ขนาดใหญ่ ชนิดผลไม้ที่ปลูกโปรดระบุ

☐ 7. อื่นๆ โปรดระบุ.....

10. ท่านเคยพาบุตรไปเที่ยวสถานที่ที่มีสวนผักหรือสวนผลไม้หรือไม่

☐ 1. เคย ☐ 2. ไม่เคย

ถ้าเคยพาไป ที่ไหน โปรดระบุ.....

ถ้าเคยพาไป ท่านเคยแนะนำให้บุตรรู้จักผัก หรือผลไม้ชนิดต่างๆ จากสวนดังกล่าวหรือไม่

☐ 1. เคย ☐ 2. ไม่เคย

11. ท่านให้บุตรช่วยในการประกอบอาหารต่างๆหรือไม่

☐ 1. ไม่เคยให้ช่วย

☐ 2. ให้ช่วยเป็นบางครั้งเมื่อเด็กอยากช่วย สิ่งที่ให้เด็กช่วย เช่น .....

☐ 3. ฝึกให้ช่วยบ่อยๆ สิ่งที่ให้เด็กช่วย เช่น .....

Copyright by Mahidol University

ตอนที่ 3

ข้อมูลเกี่ยวกับพฤติกรรมการบริโภคผักและผลไม้ของเด็กอนุบาล

ส่วนที่ 1 แบบสอบถามเกี่ยวกับพฤติกรรมการบริโภคผักชนิดต่างๆ ของนักเรียน

คำชี้แจง จงทำเครื่องหมาย √ ลงในช่องที่ท่านเห็นว่าตรงกับความเป็นจริงมากที่สุด บุตรของท่านรับประทานผักแต่ละชนิดดังต่อไปนี้หรือไม่ อย่างไร

ชนิดของผัก	รับประทานได้ดี	รับประทานได้บ้าง	ไม่ยอมรับประทาน	ไม่เคยซื้อให้รับประทาน
1. ผักกาดขาว				
2. ผักกาดหอม				
3. ผักบุ้ง				
4. กะหล่ำปลี				
5. ดอกกะหล่ำ				
6. ผักกาดเขียว				
7. มะเขือเทศ				
8. แตงกวา				
9. ฟักเขียว				
10. บวบ				
11. ฟักทอง				
12. ถั่วงอก				
13. ผักกวางตุ้ง				
14. ถั่วฝักยาว				
15. ผักตำลึง				
16. ผักคะน้า				
17. แครอท				
18. บรอคโคลี่				
19. ข้าวโพดอ่อน				
20. ผักหวาน				

Copyright by Mahidol University

ชนิดของผัก	รับประทานได้ดี	รับประทานได้บ้าง	ไม่ยอมรับประทาน	ไม่เคยซื้อให้รับประทาน
21. ผักโขม				
22. ถั่วแขก				
23. หอมหัวใหญ่				
24. ถั่วงอกหัวโต				
25. อื่นๆ โปรดระบุ				

Copyright by Mahidol University

ส่วนที่ 2 แบบสอบถามเกี่ยวกับพฤติกรรมการบริโภคผลไม้ชนิดต่างๆ ของนักเรียน

คำชี้แจง จงทำเครื่องหมาย √ ลงในช่องที่ท่านเห็นว่าตรงกับความเป็นจริงมากที่สุด บุตรของท่านรับประทานผลไม้แต่ละชนิดดังต่อไปนี้หรือไม่ อย่างไร

ชนิดของผลไม้	รับประทานได้ดี	รับประทานได้บ้าง	ไม่ยอมรับประทาน	ไม่เคยซื้อให้รับประทาน
1. กล้วยน้ำว้า				
2. กล้วยไข่				
3. กล้วยหอม				
4. ขนุน				
5. แคนตาลูป				
6. เงาะ				
7. ชมพู่				
8. แตงไทย				
9. แตงโม				
10. มะปราง				
11. มะละกอสุก				
12. มะม่วงดิบ				
13. มะม่วงสุก				
14. มะขามหวาน				
15. ละมุด				
16. ลางสาด				
17. ลำไย				
18. ลิ้นจี่				
19. สะละ				
20. สาลี่				
21. ส้ม				
22. ส้มโอ				
23. สับปะรด				

Copyright by Mahidol University

ชนิดของผลไม้	รับประทานได้ดี	รับประทานได้บ้าง	ไม่ยอมรับประทาน	ไม่เคยซื้อให้รับประทาน
24. สตรอเบอรี่				
25. องุ่น				
26. แอปเปิ้ล				
27. มังคุด				

Copyright by Mahidol University

แบบประเมินพฤติกรรมการบริโภคผักและผลไม้ของเด็กวัยอนุบาลที่บ้านภายหลังการทดลอง

แบบสอบถามผู้ปกครองของนักเรียน
เกี่ยวกับการส่งเสริมการบริโภคผักและผลไม้ของนักเรียนอนุบาล
การวิจัยเรื่อง "ประสิทธิผลของการส่งเสริมการบริโภคผักและผลไม้ในเด็กอนุบาล โดยการจัดประสบการณ์เกี่ยวกับอาหาร"

เรียน ผู้ปกครองของ ดช. / ดญ. .....
ชั้นอนุบาล...../..... โรงเรียน.....
ผู้ตอบแบบสอบถามชื่อ (นาย / นาง)..... นามสกุล.....
เกี่ยวข้องกับเด็กโดยเป็น.....ของเด็ก
อายุ ..... ปี

ส่วนที่ 1 แบบสอบถามเกี่ยวกับพฤติกรรมการบริโภคผักชนิดต่างๆ ของนักเรียน

คำชี้แจง จงทำเครื่องหมาย √ ลงในช่องที่ท่านเห็นว่าตรงกับความเป็นจริงมากที่สุด เมื่อเปรียบเทียบกับ 2 เดือนที่ผ่านมาบุตรของท่านรับประทานผักแต่ละชนิดเหล่านี้อย่างไร

ชนิดของผัก	รับประทานได้ดี	รับประทานได้บ้าง	ไม่ยอมรับประทาน	ไม่เคยซื้อให้รับประทาน
1. ผักกาดขาว				
2. ผักกาดหอม				
3. ผักบุ้ง				
4. กะหล่ำปลี				
5. ดอกกะหล่ำ				
6. ผักกาดเขียว				
7. มะเขือเทศ				
8. แตงกวา				
9. ฟักเขียว				
10. บวบ				

Copyright by Mahidol University

ชนิดของผัก	รับประทานได้ดี	รับประทานได้บ้าง	ไม่ยอมรับประทาน	ไม่เคยซื้อให้รับประทาน
11. ฟักทอง				
12. ถั่วงอก				
13. ผักกวางตุ้ง				
14. ถั่วฝักยาว				
15. ผักตำลึง				
16. ผักคะน้า				
17. แครอท				
18. บรอคโคลี่				
19. ข้าวโพดอ่อน				
20. ผักหวาน				
21. ผักโขม				
22. ถั่วแขก				
23. หอมหัวใหญ่				
24. ถั่วงอกหัวโต				
25. อื่นๆ โปรดระบุ				

Copyright by Mahidol University

ส่วนที่ 2 แบบสอบถามเกี่ยวกับพฤติกรรมการบริโภคผลไม้ชนิดต่างๆ ของนักเรียน

คำชี้แจง จงทำเครื่องหมาย √ ลงในช่องที่ท่านเห็นว่าตรงกับความเป็นจริงมากที่สุด เมื่อเปรียบเทียบกับ 2 เดือนที่ผ่านมาบุตรของท่านรับประทานผลไม้แต่ละชนิดเหล่านี้อย่างไร

ชนิดของผลไม้	รับประทานได้ดี	รับประทานได้บ้าง	ไม่ยอมรับประทาน	ไม่เคยซื้อให้รับประทาน
1. กล้วยน้ำว้า				
2. กล้วยไข่				
3. กล้วยหอม				
4. ขนุน				
5. แคนตาลูป				
6. เงาะ				
7. ชมพู่				
8. แตงไทย				
9. แตงโม				
10. มะปราง				
11. มะละกอสุก				
12. มะม่วงดิบ				
13. มะม่วงสุก				
14. มะขามหวาน				
15. ละมุด				
16. ลางสาด				
17. ลำไย				
18. ลิ้นจี่				
19. สะละ				
20. สาลี่				
21. ส้ม				
22. ส้มโอ				

Copyright by Mahidol University

ชนิดของผลไม้	รับประทานได้ดี	รับประทานได้บ้าง	ไม่ยอมรับประทาน	ไม่เคยซื้อให้รับประทาน
23. สับปะรด				
24. สตรอเบอรี่				
25. องุ่น				
26. แอปเปิ้ล				
27. มังคุด				

ส่วนที่ 3 แบบสอบถามเกี่ยวกับการเปลี่ยนแปลงพฤติกรรมการบริโภคผักและผลไม้ของนักเรียน

คำชี้แจง เมื่อเปรียบเทียบจากเดิมกับ 2 เดือนที่ผ่านมานี้ บุตรของท่านมีการเปลี่ยนแปลงพฤติกรรมการรับประทานผักและผลไม้หรือไม่ จงทำเครื่องหมาย √ ลงในช่องที่ท่านเห็นว่าตรงกับความเป็นจริงมากที่สุด ถ้ามีการเปลี่ยนแปลงโปรดอธิบายรายละเอียดเพิ่มว่าเปลี่ยนอย่างไร

1. ในช่วง 2 เดือนที่ผ่านมาจนถึงวันนี้ ท่านสังเกตเห็นว่าบุตรของท่านมีการเปลี่ยนแปลงพฤติกรรมการรับประทานผักหรือไม่

☐ ไม่มีการเปลี่ยนแปลง

☐ มีการเปลี่ยนแปลงไปในทางที่ดีขึ้น คือ (โปรดอธิบารายละเอียด).....

.....

.....

2. ในช่วง 2 เดือนที่ผ่านมาจนถึงวันนี้ ท่านสังเกตเห็นว่าบุตรของท่านมีการเปลี่ยนแปลงพฤติกรรมการรับประทานผลไม้หรือไม่

☐ ไม่มีการเปลี่ยนแปลง

☐ มีการเปลี่ยนแปลงไปในทางที่ดีขึ้น คือ (โปรดอธิบารายละเอียด).....

.....

.....

Copyright by Mahidol University

การบันทึกการสังเกต

ปฏิบัติตามขั้นตอน ดังนี้

1. บันทึกชนิดของผักและผลไม้ที่จัดให้เด็กในวันที่ทำการสังเกต

2. บันทึกปริมาณของผักและผลไม้ที่เด็กรับประทานโดยการชั่งน้ำหนักเป็นกรัม

3. สังเกตและบันทึกระดับพฤติกรรมการบริโภคผักและผลไม้ของเด็ก ซึ่งแบ่งระดับคะแนนพฤติกรรม ออกเป็น 3 ระดับดังนี้ คือ 0 1 2 ซึ่งมีความหมายดังนี้

บันทึกระดับ 0 (คะแนน) หมายถึง เมื่อเด็กไม่รับประทานแม้เตือนแล้ว

บันทึกระดับ 1 (คะแนน) หมายถึง เมื่อเด็กรับประทานโดยต้องเตือน

บันทึกระดับ 2 (คะแนน) หมายถึง เมื่อเด็กรับประทานโดยไม่ต้องเตือน

การบันทึกการสังเกตจะมีทั้งหมด 5 ครั้ง ซึ่งรายการอาหารจะมีผักชนิดเหล่านี้ คือ ฟักทอง ผักกวางตุ้ง ผักคะน้า ผักตำลึง ผักกาดเขียวเป็นส่วนประกอบ และผลไม้ที่จัดให้เป็นผลไม้ชนิดเหล่านี้ คือ มะละกอ กล้วย สับปะรด ฝรั่ง เงาะ

แบบบันทึกรายการอาหารในแต่ครั้งที่ทำการสังเกต

( ) ก่อนการทดลอง ( ) หลังการทดลอง

ครั้งที่สังเกต / วันที่	ชนิดผัก	ชนิดผลไม้
ครั้งที่ 1 /		
ครั้งที่ 2 /		
ครั้งที่ 3 /		
ครั้งที่ 4 /		
ครั้งที่ 5 /		

Copyright by Mahidol University

แบบบันทึกการสังเกตพฤติกรรมการบริโภคผักและผลไม้แต่ละชนิดของเด็กวัยอนุบาล

ครั้งที่.....

( ) ก่อนการทดลอง ( ) หลังการทดลอง

การสังเกตพฤติกรรมการบริโภคผักและผลไม้ของเด็กวัยอนุบาลด้านปริมาณของผักและผลไม้ที่รับประทาน

ชื่อนักเรียน	ผัก			ผลไม้		
	ก่อนรับประทาน (กรัม)	หลังรับประทาน (กรัม)	ปริมาณที่รับประทาน (กรัม)	ก่อนรับประทาน (กรัม)	หลังรับประทาน (กรัม)	ปริมาณที่รับประทาน (กรัม)
1.						
2.						
3.						
4.						
5.						

Copyright by Mahidol University

ครั้งที่.....

( ) ก่อนการทดลอง ( ) หลังการทดลอง

การสังเกตพฤติกรรมการบริโภคผักและผลไม้ของเด็กวัยอนุบาลด้านระดับพฤติกรรมการบริโภคผักและผลไม้

ชื่อนักเรียน	ระดับพฤติกรรมการบริโภคผัก	ระดับพฤติกรรมการบริโภคผลไม้
1.		
2.		
3.		
4.		
5.		

Copyright by Mahidol University

ส่วนที่ 1 แบบสรุปการสังเกตพฤติกรรมการบริโภคผักและผลไม้ของเด็กวัยอนุบาล
ด้านจำนวนชนิดผักและผลไม้ที่รับประทาน (รวม 5 ครั้ง)

( ) ก่อนการทดลอง ( ) หลังการทดลอง

ชื่อนักเรียน	จำนวนชนิดผักที่เด็กรับประทาน	จำนวนชนิดผลไม้ที่เด็กรับประทาน
1.		
2.		
3.		
4.		
5.		

Copyright by Mahidol University

ส่วนที่ 2 แบบสรุปการสังเกตพฤติกรรมการบริโภคผักและผลไม้ของเด็กวัยอนุบาล
ด้านปริมาณผักและผลไม้ที่รับประทาน (รวม 5 ครั้ง)

( ) ก่อนการทดลอง ( ) หลังการทดลอง

ชื่อนักเรียน	ผักชนิดที่ 1 (กรัม)	ผักชนิดที่ 2 (กรัม)	ผักชนิดที่ 3 (กรัม)	ผักชนิดที่ 4 (กรัม)	ผักชนิดที่ 5 (กรัม)
1.					
2.					
3.					
4.					
5.					

Copyright by Mahidol University

( ) ก่อนการทดลอง ( ) หลังการทดลอง

ชื่อนักเรียน	ผลไม้ชนิดที่ 1 (กรัม)	ผลไม้ชนิดที่ 2 (กรัม)	ผลไม้ชนิดที่ 3 (กรัม)	ผลไม้ชนิดที่ 4 (กรัม)	ผลไม้ชนิดที่ 5 (กรัม)
1.					
2.					
3.					
4.					
5.					

Copyright by Mahidol University

ส่วนที่ 3 แบบสรุปการสังเกตพฤติกรรมการบริโภคผักและผลไม้ของเด็กวัยอนุบาล
ด้านระดับพฤติกรรมการรับประทานผักและผลไม้ (รวม 5 ครั้ง)

( ) ก่อนการทดลอง ( ) หลังการทดลอง

ชื่อนักเรียน	ระดับพฤติกรรมการรับประทานผัก				
	ผักชนิดที่ 1	ผักชนิดที่ 2	ผักชนิดที่ 3	ผักชนิดที่ 4	ผักชนิดที่ 5
1.					
2.					
3.					
4.					
5.					

Copyright by Mahidol University

( ) ก่อนการทดลอง ( ) หลังการทดลอง

ชื่อนักเรียน	ระดับพฤติกรรมการรับประทานผลไม้				
	ผลไม้ชนิดที่ 1	ผลไม้ชนิดที่ 2	ผลไม้ชนิดที่ 3	ผลไม้ชนิดที่ 4	ผลไม้ชนิดที่ 5
1.					
2.					
3.					
4.					
5.					

Copyright by Mahidol University

APPENDIX C

The Implementation Instruments

Table 13 Lesson plans of 11 activities of the food experience program

Activities	Core concepts	Objectives	Contents	Teaching Methods
Week 1 **Health benefits of eating vegetables and fruit** **Activity 1** Cartoon: Pop Eye	- Observational learning from model (Pop Eye) - Creating knowledge - Creating acquaintance and acceptance of various kinds of vegetables and fruits - Creating vegetable and fruit eating behavior	The objectives for this activity were: students will be able to - learn about health benefits of eating vegetables and fruit. - acquire good attitudes on vegetable and fruit-eating. - be more acquainted with and accepting of various vegetables and fruit. - be more motivated to eat vegetables and fruits.	Observation from model (Pop Eye) - Pop Eye is a healthy and very strong man and he like to eat vegetable (spinach) that make him very strong.	- Video cartoon "Pop Eye" - Discussion about cartoon - Discussion about health benefit of eating vegetables and fruits - Preparation vegetables and fruits for children at lunch meal - Telling name of vegetables and fruits (at lunch meal)

Copyright by Mahidol University

Table 13 Lesson plans of 11 activities of the food experience program (continued)

Activities	Core concepts	Objectives	Contents	Teaching Methods
Week 1 **Health benefits of eating vegetables and fruits** **Activity 2** Nid's pumpkin (tale)	- Observational learning from model (Nid) - Creating knowledge - Creating acquaintance and acceptance of various kinds of vegetables and fruits - Creating vegetable and fruit eating behavior	The objectives for this activity were: students will be able to - learn about health benefits of eating vegetables and fruit. - acquire good attitudes on vegetable and fruit-eating. - be more acquainted with and accepting of various vegetables and fruit. - be more motivated to eat vegetables and fruits.	Observation from model (Nid) - Nid doesn't like to eat vegetable. She like to eat pumpkin only. She is not healthy and strong girl. One night, Nid dream that pumpkin guide her to visit vegetable garden. They meet with other vegetables. Tomato and ivy gourd tell her that they will help her to be a healthy girl. After that, Nid tell her teacher that she will eat vegetable.	- Tale "Nid's pumpkin" (with illustration) - Discussion about tale - Discussion about health benefit of eating vegetables and fruits - Preparation vegetables and fruits for children at lunch meal - Telling name of vegetables and fruits (at lunch meal)

Copyright by Mahidol University

Table 13 Lesson plans of 11 activities of the food experience program (continued)

Activities	Core concepts	Objectives	Contents	Teaching Methods
Week 2 Kinds of vegetables and planting of vegetables **Activity 3** Kinds of vegetables	- Creating knowledge - Creating acquaintance and acceptance of various kinds of vegetables and fruits - Creating vegetable and fruit eating behavior	The objectives for this activity were: students will be able to - learn about the kinds and names of vegetables. - be more acquainted with and accepting of various kinds of vegetables. - To encourage the students to eat vegetables and fruits.	- There are many vegetables, vegetables we eat leaves, stem, flower, and root. - Vegetables have different appearances and colors.	- Picture - Real vegetable - Game (answer names of vegetables) - Song about vegetables - Discussion - Preparation vegetables and fruits for children at lunch meal - Telling name of vegetables and fruits (at lunch meal)

Copyright by Mahidol University

Table 13 Lesson plans of 11 activities of the food experience program (continued)

Activities	Core concepts	Objectives	Contents	Teaching Methods
Week 2 Kinds of vegetables and planting of vegetables **Activity 4** Planting vegetable (Swamp morning glory) (ผักบุ้ง)	- Creating knowledge - Creating acquaintance and acceptance of various of vegetables and fruits - Creating vegetable and fruit eating behavior	The objectives for this activity were: students will be able to - learn about planting vegetables. - practice planting a vegetable. - be more acquainted with and accepting of various vegetables and fruit among the students. - be motivated to eat vegetables and fruits.	- Vegetables have different appearances of seeds. - Vegetables grow from their seeds. - Planting of vegetables	- Vegetables' seeds - Instruments for planting - Demonstration and explanation about planting - Preparation vegetables and fruits for children at lunch meal - Telling name of vegetables and fruits (at lunch meal)

Copyright by Mahidol University

Table 13 Lesson plans of 11 activities of the food experience program (continued)

Activities	Core concepts	Objectives	Contents	Teaching Methods
Week 3 Kinds of fruits and source of fruits **Activity 5** Kinds of fruits	- Creating knowledge - Creating acquaintance and acceptance of various of vegetables and fruits - Creating vegetable and fruit eating behavior	The objectives for this activity were: students will be able to - learn about various kinds and names of fruit. - be more acquainted with and accepting of various of vegetables and fruit among the students. - be more motivated to eat vegetables and fruits.	- There are many fruits - Fruits have different appearances, taste and colors. - Fruits have different appearances and amounts of seeds.	- Picture - Real Fruits - Game (Puzzle: answer names of fruits) - Song about fruits - Discussion - Preparation vegetables and fruits for children at lunch meal - Telling name of vegetables and fruits (at lunch meal

Copyright by Mahidol University

Table 13 Lesson plans of 11 activities of the food experience program (continued)

Activities	Core concepts	Objectives	Contents	Teaching Methods
Week 3 Kinds of fruits and source of fruits **Activity 6** Source of fruits and planting (including vegetable)	- Creating knowledge - Creating acquaintance and acceptance of various of vegetables and fruits - Creating vegetable and fruit eating behavior	The objectives for this activity were: students will be able to - to learn about the source of fruit and planting (including vegetables). - be more acquainted with and accepting of various vegetables and fruit. - be more motivated to eat vegetables and fruit.	- Fruits (and vegetables) come from garden -Growth of fruits (and vegetables)	- Slide show about garden and planting fruits (and vegetables) and explanation - Discussion - Preparation vegetables and fruits for children at lunch meal - Telling name of vegetables and fruits (at lunch meal

Copyright by Mahidol University

Table 13 Lesson plans of 11 activities of the food experience program (continued)

Activities	Core concepts	Objectives	Contents	Teaching Methods
Week 4 / Activity 7 Purchasing and selecting of vegetables and fruit	- Creating knowledge - Creating acquaintance and acceptance of various of vegetables and fruits - Creating vegetable and fruit eating behavior	The objectives for this activity were: students will be able to - learn about purchasing and selecting raw vegetables and fruit. - be more acquainted with and accepting of various of vegetables and fruit. - be more motivated to eat vegetables and fruit.	- We wants to purchase and select raw vegetables and fruits for eating -Appearances of raw vegetables and fruits	- Hand puppet show about purchasing and selecting of raw vegetables and fruit - Real vegetables and fruit - Discussion - Preparation vegetables and fruit for children at lunch meal - Telling name of vegetables and fruits (at lunch meal

Copyright by Mahidol University

Table 13 Lesson plans of 11 activities of the food experience program (continued)

Activities	Core concepts	Objectives	Contents	Teaching Methods
Week 5 Activity 8 Cleaning and preparing fruits before eating	- Creating knowledge - Creating acquaintance and acceptance of various of vegetables and fruits - Creating vegetable and fruit eating behavior	The objectives for this activity were: students will be able to - learn about cleaning and preparing fruit before eating. - practice cleaning fruits. - be more acquainted with and accepting of various of vegetables and fruit. - be more motivated to eat vegetables and fruit.	- We must clean fruits before eating - Cleaning and preparing fruits before eating	- Real fruits - Explanation and discussion about cleaning and preparing fruits - Preparation vegetables and fruits for children at lunch meal - Telling name of vegetables and fruits (at lunch meal

Copyright by Mahidol University

Table 13 Lesson plans of 11 activities of the food experience program (continued)

Activities	Core concepts	Objectives	Contents	Teaching Methods
Week 6 / Activity 9 Cooking	- Creating knowledge - Creating acquaintance and acceptance of various of vegetables and fruits - Creating vegetable and fruit eating behavior	The objectives for this activity were: students will be able to - learn about cooking and preparing vegetables before eating or cooking. - practice cooking. - build acquaintance and acceptance of various vegetables and fruit. - enhance motivation to eat vegetables and fruit.	- Cleaning vegetable before eating or cooking - Cooking (ivy gourd soup)	- Explanation and discussion about preparation vegetable before cooking - Explanation about cooking - Cooking - Preparation vegetables and fruits for children at lunch meal - Telling name of vegetables and fruits (at lunch meal

Copyright by Mahidol University

Table 13 Lesson plans of 11 activities of the food experience program (continued)

Activities	Core concepts	Objectives	Contents	Teaching Methods
Week 7 / Activity 10 Art activity	- Creating acquaintance and acceptance of various of vegetables and fruits - Creating vegetable and fruit eating behavior	The objectives for this activity were: students will be able to - practice an art activity from vegetables and fruit. - remember the names and appearances of vegetables and fruit including their essential parts - build acquaintance and acceptance of various vegetables and fruit. - enhance motivation to eat vegetables and fruit.	- There are many vegetables and fruits and we can use them to make Cartoons and pictures. - Make cartoons from several vegetables - Make flower picture from banana stalk	- Book "Puk Plang Gai" in thai - Banana stalks, papers, water colors - Explanation and discussion - Preparation vegetables and fruits for children at lunch meal - Telling name of vegetables and fruits (at lunch meal

Copyright by Mahidol University

Table 13 Lesson plans of 11 activities of the food experience program (continued)

Activities	Core concepts	Objectives	Contents	Teaching Methods
Week 8 / Activity 11 Vegetable and fruit party	- Creating acquaintance and acceptance of various of vegetables and fruits - Creating vegetable and fruit eating behavior	The objectives for this activity were: students will be able to - remember the names and appearances of vegetables and fruit. - build acquaintance and acceptance of various vegetables and fruit. - enhance motivation to eat vegetables and fruits.	- There are many vegetables and fruits that we can eat in this party - Kinds of vegetables and fruits which students can remember	- Food that vegetables are ingredients and several fruits for party - Games and song - Preparation vegetables and fruits for children at lunch meal - Telling name of vegetables and fruits (at lunch meal

Copyright by Mahidol University

รายการอาหาร 5 รายการที่จัดให้นักเรียนรับประทานในวันที่ทำการสังเกตการรับประทานผักและผลไม้ก่อนและหลังการทดลอง

รายการที่ 1 ราดหน้าใส่ผักคะน้า ผลไม้คือ เงาะ

รายการที่ 2 แกงจืดผักกาดขาวหมูสับ ผลไม้คือ ฝรั่ง

รายการที่ 3 แกงจืดตำลึงหมูสับ ผลไม้คือ มะละกอ

รายการที่ 4 บะหมี่ลูกชิ้นใส่ผักกวางตุ้ง ผลไม้คือ สับปะรด

รายการที่ 5 ผัดฟักทองใส่หมูและไข่ ผลไม้คือ กล้วย

คำคล้องจองเกี่ยวกับผลไม้

ส้ม

ฉันคือส้ม ผลกลมรสดี
ตัวฉันมี วิตามินซีมากมาย
ทั้งยังช่วย ต้านทานโรคภัย
ช่วยขับถ่าย ให้ไปได้ตามเวลา

มะละกอ

มะละกอเอย รอบคอเจ้ามีลูกรัก
ใบเจ้าเป็นหยักๆ สุกอร่อยนักอยาบอกใคร
เก็บก้านมะละกอมาเล่น ฟองสบู่เป่าเป็นลูกโป่งใหญ่
สนุกไม่น้อยนะกลอยใจ เป่าได้เป่าไปอย่าหยุดเอย

ปริศนาคำทายเกี่ยวกับผลไม้

แตงอะไรเอ่ย รูปร่างกลมๆ ข้างนอกสีเขียว ผ่าไปข้างในสีแดง รับประทานแล้วหวานชื่นใจ ใครทายได้ฉันคืออะไร (ตอบ แตงโม)

ฉันมีรูปร่างกลมๆ สีเขียวก็มี สีเหลืองก็มี เนื้อในหวานดี บางทีก็เปรี้ยว กลีบในสีส้ม ป้องกันหวัด (ตอบ ส้ม)

อะไรเอ่ย ต้นเท่าขาใบวาเดียว (ตอบ กล้วย)

อะไรเอ่ย ใบหยักๆ ลูกรักเต็มคอ (ตอบ มะละกอ)

อะไรเอ่ย มีตารอบตัว มีหัวหัวเดียว (ตอบ สับปะรด

Copyright by Mahidol University

บทละครการแสดงหุ่นมือ

ที่บ้าน

แม่ นิด โหน่ง ไปตลาดกับแม่ไหมจ๊ะ

นิด ไปค่ะ

โหน่ง ไปครับ

แม่ งั้นไปกันเลยจ้ะ เดินดีๆ นะลูก ระวังรถด้วย

.....

ที่ตลาด

แม่ ถึงตลาดแล้ว เดินตามแม่มานะ.....วันนี้ซื้อผักอะไรดี

นิด คุณแม่คะ หนูอยากทานแกงจืดตำลึงค่ะ

แม่ งั้นเดี๋ยวไปซื้อตำลึงกันก่อน โหน่งหล่ะอยากทานอะไรจ๊ะลูก

โหน่ง อยากทานผัดผักรวมมิตร ใส่ฟักทอง ผักกาด และแครอทครับคุณแม่

แม่ แหม ดีจัง วันนี้จะได้ทานผักหลายชนิดเลย อ้าวถึงแล้ว ร้านที่แม่ซื้อประจำมีผักเยอะแยะเลย สดๆ ทั้งนั้น

นิด คุณแม่คะ จะเลือกซื้อตำลึงยังไงคะ

แม่ ก็นี่ไง เห็นมั้ยตำลึง หนูต้องดูที่ยังสดอยู่นะคะ ไม่มีใบเน่าเสีย และเลือกที่มีใบอ่อนมากๆ จ้ะ

โหน่ง แล้วผักกาดล่ะครับคุณแม่

แม่ ก็ซื้อที่มีใบสดๆ ไม่เน่าเสีย และมีแมลงกัดกิน

โหน่ง ทำไมละครับคุณแม่

แม่ ก็จะปลอดภัยจากอันตรายของยาฆ่าแมลงยังไงละจ๊ะ

โหน่ง เข้าใจแล้วครับ

แม่ แต่ก่อนรับประทาน เราต้องล้างผักให้สะอาดก่อนทุกครั้งนะจ๊ะ

โหน่ง คุณแม่ครับ ผมช่วยถือครับ

แม่ ขอบใจจ้ะ งั้นไปซื้อผลไม้กันต่อ ไหนใครอยากทานผลไม้อะไรบ้างจ้ะ

นิด หนูอยากทานกล้วยและมะละกอค่ะคุณแม่

โหน่ง ผมอยากทานสับปะรดและเงาะด้วยครับ

แม่ แหม ลูกของแม่ทั้งสองนี่ ทานผักและผลไม้เก่งทั้งสองคนเลยจ้ะ

นิด โหน่ง ก็ผักและผลไม้มีประโยชน์มากใช่ไหม (คะ ครับ) คุณแม่

Copyright by Mahidol University

แม่ ใช่แล้วจ้ะ คนเก่ง

โหน่ง แล้วเราจะเลือกผลไม้ยังไงครับคุณแม่

แม่ ก็เลือกที่สดใหม่ ไม่เน่าเสียไงจ๊ะลูก นี่ไงถ้ากล้วยที่เน่าเสียอย่างนี้เราก็ไม่เอา

นิด คุณแม่คะ เดี๋ยวหนูขอซื้อฝรั่งไว้ทานพรุ่งนี้ด้วยนะคะ

แม่ ได้จ้ะ

เอ้า เราได้ผักและผลไม้ครบแล้ว เดี๋ยวแม่ไปซื้อหมูและไก่อีกซักหน่อย แล้วเรากลับบ้านกันเลยนะจ๊ะ

นิด ค่ะคุณแม่

โหน่ง ดีครับ ผมอยากทานผัดผักแล้วละครับแม่

นิทานเรื่อง ฟักทองของนิด

(มีภาพวาดเป็นภาพพลิกประกอบ)

หนูนิดตัวนิดสมชื่อและไม่แข็งแรง หนูนิดไม่ชอบกินผัก มื้อไหนมีผัก หนูนิดจะร้อง "ยี้!" ไม่ยอมกิน เธอว่า "เหม็นก็เหม็น อร่อยก็ไม่อร่อย" หนูนิดชอบกินแต่ฟักทองเท่านั้น

คืนหนึ่ง หนูนิดฝันว่าฟักทองมาชวนไปเที่ยวสวนผัก ในสวนผักมีเด็กๆ วิ่งเล่นกันอย่างสนุกสนาน ทุกคนร่างกายแข็งแรง หน้าตาสดใส "เขาชอบกินฟักทองกันทุกคน" ฟักทองบอก "ผักอะไรจ๊ะ" หนูนิดสงสัย "ผักทุกอย่างเลยจ้ะ" ฟักทองพาหนูนิดไปพบมะเขือเทศและตำลึง ตำลึงบอกว่า "ฉันจะช่วยให้เธอแข็งแรง" มะเขือเทศบอกว่า "ฉันจะช่วยให้ผิวเธอสวยและไม่เป็นหวัดง่าย" ฟักทองพูดกับหนูนิดอย่างใจดี " ฉันก็ช่วยให้สายตาเธอดี พวกเราจะช่วยเธอ ถ้าเธอกินผักเป็นอาหาร"

วันรุ่งขึ้น หนูนิดรีบไปโรงเรียนแต่เช้า เล่าเรื่องที่ฝันให้คุณครูฟัง " ฝันดีนะ ผักช่วยให้ร่างกายแข็งแรงจริงๆ ด้วย นิดลองกินผักบ้างซิจ๊ะ" "ค่ะ" หนูนิดรับคำ (หนังสือประกอบการเรียนการสอนภาษาไทยแบบมุ่งประสบการณ์ภาษา ชั้นประถมการศึกษาปีที่ 1 สำนักงานคณะกรรมการการศึกษาขั้นพื้นฐาน กระทรวงศึกษาธิการ)

Copyright by Mahidol University

APPENDIX D

Additional Tables

Table 14 Numbers and percentages of the vegetable and fruit consumption behaviors of the families (N = 26)

Consumption behavior	Number	Percentage
Family's members who do not eat vegetables		
None	**12**	**46.0**
Eligible student	12	46.0
Sibling	2	8.0
Frequency of preparing vegetables to eat		
2-3 day/week	5	23.0
4-5 day/week	8	15.0
Everyday	13	62.0
Frequency of preparing fruits to eat		
2-3 day/week	6	19.0
4-5 day/week	4	31.0
Everyday	16	50.0

Copyright by Mahidol University

Table 15 Number and percentage of the family's food preparation for their child (N = 26)

Food preparation	Number	Percentage (100%)
Persons who prepared food for their child		
Mother or father	**17**	**65.0**
Grandmother	7	27.0
Aunt	2	8.0
Work place of persons who prepared food		
At home	17	65.0
Outside	9	35.0
Food preparation		
Cook (by themselves at home)	13	50.0
Cook & eat at restaurant	3	12.0
Cook & buy to eat at home	5	19.0
Eat at restaurant & buy to eat at home	5	19.0

Copyright by Mahidol University

Table 16 Numbers and percentages of the parent's promoting behaviors on vegetable and fruit eating to students (N = 26)

Characteristics	Numbers	Percentages
Frequency of preparing food with vegetables for their child		
Never	1	4.0
2-3 day/week	7	27.0
4-5 day/week	8	31.0
Everyday	10	38.0
Exhorting and leading their child to eat vegetables and fruits		
Seldom exhorted and lead	3	11.0
Always exhorted and lead	23	89.0
Giving admiration or rewards when their child eat vegetables		
Never	4	15.0
Seldom	8	31.0
Always	14	54.0
Giving admiration or rewards when their child eat fruits		
Never	6	23.0
Seldom	6	23.0
Always	14	54.0

Copyright by Mahidol University

Table 17 Distribution of the mean amounts of each vegetable intake of the students

Kinds of vegetables	Chinese kale		Chinese white cabbage		Ivy gourd		Chinese cabbage		Pumpkin	
	Before	After	Before	After	Before	After	Before	After	Before	After
Mean	21.04	25.40	15.87	40.00	7.27	16.04	3.89	15.21	6.15	18.13
S.D.	23.96	23.80	17.43	31.95	12.22	16.22	9.93	13.39	11.69	19.72
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	80.00	60.00	55.00	100.00	50.00	60.00	40.00	50.00	50.00	70.00

Table 18 Distribution of the mean amounts of each fruit intake of the students

Kinds of fruits	Rambutan		Guava		Papaya		Pineapple		Banana	
	Before	After	Before	After	Before	After	Before	After	Before	After
Mean	59.38	122.29	29.13	27.69	70.23	84.40	66.11	66.25	56.15	67.40
S.D.	32.81	73.48	33.83	44.75	56.77	65.50	55.69	57.98	36.34	26.66
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	100.00	330.00	115.00	110.00	200.00	235.00	200.00	240.00	100.00	100.00

Copyright by Mahidol University

Table 19 Distribution of the mean scores of each vegetable-eating behavior of the students

Scores of vegetable-eating	Chinese kale		Chinese white cabbage		Ivy gourd		Chinese cabbage		Pumpkin	
	Before	After	Before	After	Before	After	Before	After	Before	After
Mean	1.00	1.40	0.78	1.85	0.68	1.46	0.33	1.42	0.50	1.67
S.D.	0.88	0.82	0.67	0.55	0.72	0.78	0.69	0.72	0.71	0.70
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

Table 20 Distribution of the mean scores of each fruit-eating behavior of the students

Scores of Fruit-eating	Rambutan		Guava		Papaya		Pineapple		Banana	
	Before	After	Before	After	Before	After	Before	After	Before	After
Mean	1.50	1.92	0.96	0.77	1.32	1.60	1.39	1.75	1.23	1.84
S.D.	0.66	0.41	0.77	1.01	0.89	0.82	0.85	0.53	0.82	0.55
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

Copyright by Mahidol University

BIOGRAPHY

NAME	Miss Kingkarn Iedsee
DATE OF BIRTH	24 October 1971
PLACE OF BIRTH	Nakhon si thammarat, Thailand
INSTITUTIONS ATTENDED	Prince of Songkhla University, 1990-1994: Bachelor Nurse Science Mahidol University, 2001 – 2005: Master of Science (Public Health) Major in Nutrition
HOME ADDRESS	49 Chedumnad Road, Banbung Place, Banbung District, Chon Buri Province, 20170

Copyright by Mahidol University