CHAPTER 3
RESEARCH METHODOLOGY

This chapter presents the detail of the research procedure based on the title of the research; the development of English vocabulary learning ability by using games for Matthayom Suksa 3 students. The researcher describes and explains the details of research methodology in the following topics.

1. Population and participants
2. Research instruments
3. Construction and efficiency of the instrument
4. Research methodology and data collection
5. Statistics used in the research

3.1 Population and participants

The population in this research included 122 students of Matthayom Suksa 3 who were studying in the second semester of the 2016 academic year in the Holy Infant Jesus Roi-Et School, Robmuang sub- district, Muang district, Roi-Et Province. The participants of this study were 30 students selected through cluster sampling.

3.2 The Research Instruments

The instruments used in this research consisted of the following:

3.2.1 Instructional plans including games in the teaching process

3.2.2 Pretest and posttest

3.2.3 Questionnaire

3.3   Construction and efficiency of the instrument

3.3.1 Instructional plans include game in teaching process. The instructional plans were taken from 4 lessons which were divided into 6 topics as shown in tables 3.1. In the instructional plan writing, the researcher conducted the following steps:

3.3.1.1 Studied the principles and elements of the plans by analyzing curriculum, indicators, learning standards, learning and teaching methodology as well as assessment.

3.3.1.2 Studied procedures of instructional plan writing from other educators and other researchers.

3.3.1.3 Conducted the instructional plans that corresponded to the objectives and teaching methodology. There were six instructional plans, one plan for approximately one week (3 periods per week). Each instructional plan consisted of a heading that consisted of the number of the instructional plan; learning strands area; class; topic; time and date; concept use of the plan, objectives of learning and teaching, activities used in the plan, learning processes; materials or media and the assessment of learning. The learning process of the instructional plans consisted of four stages: warm up, presentation, practice and production.

Table 3.1

The instructional plans in this research

Instructional plan	Lesson	Topic	Game	Duration
1	Family Relationships	Family Relationships	Card guessing	3 hrs.
2	Family Relationships	Where's the fire?	Crosswords Game	3 hrs.
3	An Emergency?	Let's call an ambulance!	Mime Game	3 hrs.
4	An Emergency?	A ransom or a reward?	Who am I?	3 hrs.
5	Healthy Living	Eating the rainbow	Slap Game	3 hrs.
6	Green Living	What's it made of?	Dice rolling	3 hrs.

Table 3.1 demonstrates the lessons, topics, games and duration of each instructional plan.

3.3.1.4 Designed the instructional plan evaluation form for experts to check before using instructional plans. For the instructional plan evaluation, this researcher used a rating scale evaluation. The scale was from strongly disagree to strongly agree followed Likert's scale and Boonchom Srisa ard (2010:100) as follows:

1) Rating scale

5 marks	=	strongly agree
4 marks	=	agree
3 marks	=	neutral
2 marks	=	disagree
1 mark	=	strongly disagree

2) Rating scale meaning

4.51-5.00	=	strongly agree
3.51-4.50	=	agree
2.51-3.50	=	neutral
1.51-2.50	=	disagree
1.00-1.50	=	strongly disagree

3.3.1.5 The instructional plans were reviewed by five experts to check the consistency of the plan with learning objectives and improving before the final versions were completed. The experts were:

1) Associate Professor Dr. Narongrit Sopha, Associate Professor in Art Program in Development Strategy, checking the contents and language used in this research.

2) Dr. Upit Muantong, Educational supervisor in the Secondary Educational Service Area Office 27 (Roi-et), checking the contents and language used in this research.

3) Mrs. Karanyawan Kainunsing, Educational supervisor in the Secondary Educational service Area Office 27 (Roi-et), checking the contents and language used in this research.

4) Mrs. Nipharat Thummasarn, Senior Professional Level Teachers (K 3 Teachers) in Chumchonchiangmaipattana School, checking the contents of assessment and evaluation.

5) Mrs. Sanidapron Punnongwha, Senior Professional Level Teachers (K 3 Teachers) in Satri Suksa School, checking the contents of assessment and evaluation. The expert's suggestions for improving were:

5.1) In the warm up stage, it should start with teaching vocabulary first before teaching reading and grammar.

5.2) Game should be suitable to student level.

5.3) Some games were not interesting

3.3.1.6 The plans were adjusted following the comments of the experts.

3.3.1.7 The plans were tried out with one group which was not the participant group.

3.3.1.8 The plans were adjusted again to solve the problems found from the tried out group.

3.3.1.9 The final plans were used with the participant group.

3.3.2 Pretest and Posttest.

Pretests and posttests were constructed to be an achievement test for this research and conducted in accordance with the course syllabus and contents related to the course. The achievement test conducting procedure was as follow:

3.3.2.1 The researcher studied the test conducting procedure and test evaluation from other educators and researchers.

3.3.2.2 The researcher created the two achievement tests as follows:

1) The tests of each topic were achievement tests for evaluating participants during learning in each topic or each instructional plan. These achievement tests were multiple choices with four choices and consisted of 20 items for each instructional plan or each topic.

2) The mixed test was an achievement test for evaluating participants after learning all the topics. The achievement tests were multiple choices with four choices and consisted of 50 items.

The achievement tests were based on objectives of the lesson and vocabularies from 4 lessons in Team up for the M.3 book, in 6 topics: Family relationships, Where's the fire?, Let's call an ambulance!, A ransom or a reward?, What's it made of? and Eating the rainbow.

3.3.2.3   The achievement tests were checked by five experts in the field of English or English language teaching to check the validity of the achievement test by using the index of item objective congruence or IOC. The usable items should be more than 0.5 in IOC. The experts who checked the achievement tests were the same as the instructional plan checked.

The results of expert's suggestions for improving were:

1) The pretest and posttest for each lesson should have equal items that will be easy to evaluate.

2) The pretest and posttest should contain picture and other type of test; items, filling in blanks or matching.

3) The instructions of the test are not clear.

4) There are duplicate questions in the test.

5) Some vocabulary is difficult.

Then the contents and details of the achievement test were adjusted based on their suggestions

3.3.2.4   After adjustment, the achievement tests were tried out with 30 students in Matthayom Suksa 3/4 who were not the same group as the participants. The researcher use the scores of each item to find out the difficulty (P) were 0.2-0.38, discrimination (R) were 0.2-0.4 and reliability was 0.965.

3.3.2.5   All achievement tests were reviewed again before the final models were completed and used for testing the participants.

3.3.3 Questionnaire

The questionnaire was designed to study the experimental participants' attitude to learning though the games. The procedures of conducting the questionnaire were:

3.3.3.1 The questionnaire was designed: researcher studied how to construct a questionnaire and adapted questionnaire from other researchers. The questionnaire was divided into three parts:

1) General information consisting of age and gender of the participants,

2) The attitude to vocabulary learning through game activities consisting of 15 question items with scale of agreement,

3) Open ended questions for expressing opinion.

3.3.3.2 The questionnaire was reviewed for correctness, appropriateness and validity by five experts. Then it was improved and was tried out with 30 students in Matthayom Suksa 3/4 who were not the same group as the participants before the final version was completed. The index of item objective congruence (IOC) of the questionnaire was 0.8-1.

3.3.3.3 The questionnaire was used to collect the data about attitude toward learning and teaching methodology with the participants.

3.4 Research methodology and Data Collection

The research was undertaken according to one-group pretest- posttest design.

Group	Pre - test	treatment	Post- test
One-Group	O_1	X	O_2

Figure 3.1 One-group pretest-posttest designs

In a one-group pretest-posttest design, a pretest was constructed to evaluate participants' background knowledge (O1), followed by teaching using game activities (X), then the posttest was conducted (O2). The experimental procedures were divided into 4 stages:

3.4.1 In the first week, the participants including 30 Mattayom Suksa 3 students were informed of the purposes of the course syllabus. Then, they were tested by a pretest exam that consisted of fifty items. The purpose of this pretest was to estimate the background knowledge of the participants. The scores of each participant were collected as data for this study.

3.4.2 In the second to the seventh week, teaching and learning was carried out, using the instructional plans that the researcher had constructed. One plan covered 3 periods in each week. Within each week, students had to do the exercises that related to the contents of the plan.

Table 3.2

Schedule and Content of Teaching

Week (s)	Teaching Content
1st Week	Pre Test
2nd Week	Family Relationships
3rd Week	Where's the fire?
4th Week	Let's call an ambulance!
5th Week	A ransom or a reward?
6th Week	Eating the rainbow
7th Week	What's it made of?
8th Week	Post Test
9th week	Attitude Questionnaire

3.4.3 In the eighth week, the participants were tested again by posttest which was the same test as pretest. The purpose of this posttest was to estimate the progress and success of the participants. The scores of participants were collected as data for this study.

3.4.4 In the ninth week, the participants answered the questionnaire asking about their attitude towards English vocabulary learning by using games. The scores of the opinions of the participants were collected as data for this study.

3.5 statistics used in the research

In this study, the researcher use descriptive statistics to analyze the effectiveness of vocabulary learning by using game for Mattayom Suksa 3 students.

3.5.1 Statistics for efficiency of the instrument

3.5.1.1   Index of Item-Objective Congruence or IOC to evaluate the congruence between the objective and the content and the test items. (Somnuk Patthiyatane, 2003, pp. 218-220)

Formula $\quad\quad\quad IOC = \frac{\sum R}{N}$ $\quad\quad\quad$ *(3-1)*

IOC $\quad$ is $\quad\quad$ Index of Item-Objective Congruence

$\sum R$ $\quad$ is $\quad\quad$ the total points of expert opinion

N $\quad$ is $\quad\quad$ number of experts

The IOC of $0.5 - 1.0$ are acceptable.

3.5.1.2   The difficulty of the test is evaluated by this formula of Boonchom Srisa ard (2011, p. 95)

$$P = \frac{R}{N}$$ $\quad\quad\quad$ *(3-2)*

P $\quad$ is $\quad$ the item difficulty index

R $\quad$ is $\quad$ the number of test takers who were correct

N $\quad$ is $\quad$ the total number of test takers

3.5.1.3 The item-discrimination index. Boonchom Srisa ard (2010, p. 96)

$$r \quad = \quad \frac{R_H \ - \ R_L}{N}$$ $\quad\quad\quad$ *(3-3)*

where;

$\quad\quad\quad$ R_H $\quad$ is $\quad$ the number of test takers in the upper group

$\quad\quad\quad$ R_L $\quad$ is $\quad$ the number of test takers in the lower group

$\quad\quad\quad$ N $\quad$ is $\quad$ the total number of test takers in the total group

3.5.1.4 The reliability of the test is evaluated by KR-20 of Kuder-Richardson (Maliwan, 2007):

$$R_n \quad\quad\quad = \frac{k}{k-1}\left(1 - \frac{\sum_{j=1}^{k} p_j q_j}{\sigma^2}\right)$$ $\quad\quad\quad$ *(3-4)*

where

k	is	number of questions
p_j	is	number of people in the sample who answered question j correctly
q_j	is	number of people in the sample who didn't answer question j correctly
σ^2	is	the square of the variance of the total scores of all the people taking the test = VARP(R1) where R1 = array containing the total scores of all the people taking the test.

3.5.2 Basic Statistics (Paisarn worakum, 2015, pp. 313-385)

  3.5.2.1 Mean ($\bar{x}$)

$$\overline{X} \quad = \quad \frac{\sum x}{n} \qquad\qquad (3\text{-}5)$$

$\overline{X}$	is	each of the values of the sample
n	is	the number of samples

  3.5.2.2 Standard Deviation (S.D.)

$$S.D. \quad = \quad \sqrt{\frac{\sum(x1-\overline{x2})^{\,2}}{n-1}} \qquad\qquad (3\text{-}6)$$

X	is	each of the values of sample
n	is	the number of samples

  3.5.3 Statistics for the hypothesis test, A t-test was used to test the hypothesis that the students' English vocabulary after studying (posttest) is higher than before studying through games (pretest).

$$H0 \quad : \mu1=\mu2$$

$$H1 \quad : \mu2>\mu1$$

$$\text{T-test} \quad = \quad \frac{\sum D}{\sqrt{\frac{n\sum D^2 - (\sum D^2)}{n-1}}} \qquad (3\text{-}7)$$

When $\quad df = n\text{-}1$

D   is   the difference between posttest and pretest

n   is   the number of participants

     3.5.4 The effectiveness of the instructional plan, English vocabulary learning ability by using games was analyzed by effectiveness index (E.I.) (Somnuk Patthiyatane, 2003, pp. 218-220)

$$\text{E.I.} \quad = \quad \frac{P_2 - P_1}{(number\ of\ student \times number\ of\ test\ item)\ -\ P_1} \qquad (3\text{-}8)$$

P_2 is   summation of posttest score

P_1 is   summation of pretest score