

## CHAPTER 3

### Methodology

This research is the Research and Development genre with the objectives to study the context and the needs for developing the competency for research conduction of the faculty of Physical Education Institute in the North, to develop the model for competency development of the faculty of Physical Education Institute in the North, and to study the efficiency of the development model of competency for research conduction of the faculty of Physical Education Institute in the North. The steps are divided into three steps which are given below.

1. Study on the context and needs for competency development for research conduction of the faculty of Physical Education Institute in the North.
2. Development of the model for development model for competency of research conduction of the faculty of Physical Education Institution in the North.
3. Study on the efficiency of the development model for competency for research conduction of the faculty of Physical Education Institute in the North.

The details in each step are as the followings.

**Phase 1.** Study on the context and the needs for developing competency on research conduction of the faculty of Physical Education Institute in the North.

#### Objective

To study the context and needs for developing the competency for research conduction of the faculty of Physical Education Institute in the North.

## **Method**

Study about the context and needs for developing the competency of research conduction of the faculty of Physical Education Institute in the North through the collection of data from the questionnaire. The data will be used as basic data to identify the content framework for developing the Model that it responds to the context and the needs of the faculty of the Physical Education Institute in the North.

### **Study Population**

Population is the faculty of physical education institute from the North campuses. The population samples of 144 samples come from Chiangmai, Lampang, Sukhothai, and Petchaboon campuses.

### **Sample group**

The respondents of the data collection which are used to study on the context and needs for developing competency of the faculty of physical education institute are the faculty of Physical Education Institute in the North in the fiscal year of 2013. They are 94 people out of the total population of 144 people. This size comes from the table of the sample group of Darwin Hendel (1977) at the reliability level at 95 percent, which is a low criterion. In this research, however, the researcher takes a sample group of 102 people. These samples are taken through a stratified random sampling and a simple random sampling. The details are shown as below.

Step 1 Identify the stratification of the Physical Education Institute according to the number of the faculty in the 4 campuses in the North which are Chiangmai Campus, Petchaboon Campus, Lampang Campus and Sukhothai Campus.

Step 2 Make the Stratified Random Sampling through (Simple Random Sampling) according to the number of sample group which is calculated in each institute as following.

Table 3.1 Study Population and the Sample Group of Faculty of Physical Education Institute in the North.

Physical Education Institute in the North	Number of Population	Number of samples
1. Chiangmai Campus	43	30
2. Lampang Campus	28	20
3. Sukhothai Campus	41	29
4. Petchaboon Campus	32	23
<b>Total</b>	<b>144</b>	<b>102</b>

#### **Tools used for data collection**

The tools which will be used in this step are shown below.

The tool set number 1 is the questionnaire for the faculty of Physical Education Institute in the North regarding the context on the policy on promoting the research, on the environment that supports research conduction, on the personnel who conduct research, on the amount of research, and on the need for competency development which can be divided into two parts as the followings.

Part 1: Demographic data of the sample group such as sex, age, position, implementation site, and experience in research conduction.

Part 2: Questionnaire on the context and the needs for the competency development on research conduction, which are divided further into four aspects.

2.1 On the context. The questionnaire will be set in five rating scale from highest, high, moderate, little, to the least and some open-ended questions.

2.2 On the need for developing competency on research conduction by using the questionnaire in the dual–response format which have five rating scale from highest, high, moderate, little to the least with open-ended questions.

2.3 On problem, obstacle, and suggestion in the open-ended questions by asking the issues on problems, obstacles, and suggestions to the research conduction.

2.4 On the model that is undergoing development on the competency on research conduction with open-ended questions.

The criteria for interpreting to scoring are set as the following (Boonchom Srisa-ard, 2002: 160-162).

Mean	4.50 – 5.00	the highest level
Mean	3.50 – 4.49	high level
Mean	2.50 – 3.49	moderate level
Mean	1.50 – 2.49	little/low level
Mean	1.00 – 1.49	the least level

Tool set number 2 is on the attitude toward the research conduction among the faculty of Physical Education Institute in the North through the five rating scale which are highest, high, moderate, little and the least.

The criteria for interpreting to scoring are set as the followings (Boonchom Srisa-ard, 2002: 160-162).

Mean	4.50 – 5.00	Have attitude toward research conduction in the highest level.
Mean	3.50 – 4.49	Have attitude toward research conduction in the high level.
Mean	2.50 – 3.49	Have attitude toward research conduction in the moderate Level.

Mean 1.50 – 2.49 Have attitude toward research conduction in the little level.

Mean 1.00 – 1.49 Have attitude toward research conduction in the least level

### **Quality check of the tools**

In checking the validity of the research design, the researcher brings the questionnaire to five experts to check the content validity through the analysis of the analysis or Index of Congruence (IOC) based on the expert's opinion. After the check from experts, the researcher revises the questionnaire to make revision based on the suggestion of the experts.

The analysis of Index of Congruence (IOC) uses the formula as the followings.

$$\text{IOC} = \frac{\Sigma R}{N}$$

When IOC represents Index of Congruence among the experts' opinion

R represents Score of opinion

$\Sigma$  represents Total score

N represents Number of experts

The calculation to check of validity on both of questionnaires shows that both of them have the IOC between 0.80 and 1.00.

### **Checking the Reliability**

Testing the quality of the questionnaire or the reliability by the tools number 1 and number 2 is done through a trial-use with some 30 faculty in physical education institute who are not parts of the sample group. Then the results are analyzed for the reliability through the calculation to find their Cronbach's Alpha Coefficient. The test on the quality of the tool on reliability shows the reliability value of the tool number 1 on the context and the needs for the development of competency on research conduction

equals to 0.98. The reliability of the tool number 2 on attitude toward the research conduction of the faculty stands at 0.95.

### **Data Collection**

The researcher collects the data by the following implementation.

1. Asking for introduction letter from Graduate School of Chiangmai University to ask for permission from the school administrators to conduct research.
2. Meeting the deputy dean of the campuses, identifying the objectives, asking permission, and asking for cooperation for research conduction.
3. Meeting the sample group, identifying the objective of research, and asking for cooperation in research.
4. Collecting the data through the questionnaire from the faculty of physical education institute.
5. Checking the correctness and completeness of the data.
6. Bringing the data from the questionnaire to analyze by using the statistical methods and the content analysis.

### **Data analysis**

The data analysis employs the quantitative technique. The researcher turns the data from the questionnaire to analyze through a set of computer programs which accomplish the followings.

1. Calculating the frequency and percentage of the general data of the sample group.
2. Calculating the means and standard deviations of the scores from the questionnaire on the context and needs for developing the competency on research conduction and the attitude toward research conduction of the faculty of Physical Education Institute in the North.

3. Analyzing the needs for developing the competency for research conduction of the faculty of Physical Education Institute in the North through the analysis of score differences on knowledge on research conduction at present and the expectation gathered from the questionnaire.

4. Prioritize the Priority Needs Index or  $PNI_{\text{modified}}$  and in case that the equal values of  $PNI_{\text{modified}}$  appear, the consideration on the value of PNI is used.

5. Analyzing the context of physical education institute on research with the process of SWOT Analysis.

6. Analyzing the Model for developing the competency on research conduction through the process of Focus Group.

#### **The statistics used for data analysis**

The researcher utilizes the statistical methods for data analysis as the followings.

1. Percentage will be used for data analysis of general data or demographic data of the respondents.

2. Means ( $\bar{X}$ ) and standard deviations (S.D.) are used to analyze the context on the research and the faculty's attitude toward research conduction.

3. Paired sample t-test uses the comparison of the mean ( $\bar{X}$ ) and the standard deviations (S.D.) of scores on knowledge in research conduction at present and the expectation of the faculty of Physical Education Institute in the North.

Priority Needs Index (Suwimol, 2007) is calculated by using the formula as the followings.

$$\text{Value } PNI_{\text{modified}} = (I-D)/D$$

When I represents the expected knowledge/skill  
D represents knowledge/skill at present

In case the equal value of  $PNI_{\text{modified}}$  appear, the PNI value will be considered by using the formula for calculation as below.

$$PNI \text{ value} = (I-D) \times I$$

When I represent the expected knowledge/skill

D represents the existing knowledge/skill at present.

Summary of guideline for studying based on Step 1. Study is done on the context and the needs for developing competency for research conduction in the faculty of Physical Education Institute in the North. There are important steps as what follows in Diagram 3.1.

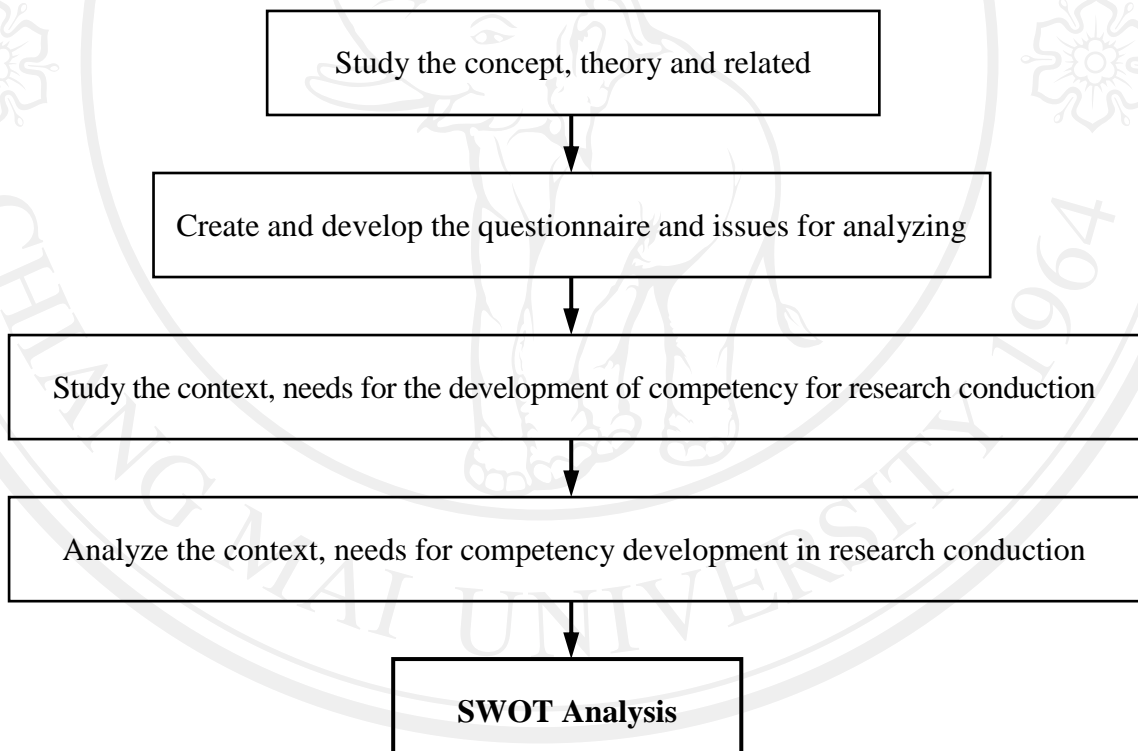


Figure 3.1 The guideline for study based on step 1



**Phase 2.** The development model for developing competency for research conduction of the faculty of Physical Education Institute in the North

The model development of developing competency for research conduction of the faculty of Physical Education Institute in the North has the following process.

**Step 2 .1** Drafting of the model for developing the competency for research conduction of faculty of Physical Education Institute in the North.

### **Objectives**

To draft the model for developing the competency for research conduction of the faculty of Physical Education Institute in the North.

### **Method of study**

1. Drafting the model for developing the competency for research conduction of faculty of Physical Education Institute in the North and the manual for developing the competency development for research conduction of the faculty in Physical Education Institute in the North. The researcher applies the data derived from the studying of the secondary data as the followings.

1.1 Analyze, synthesize the secondary data and related literature.

1.2 Study the context on the research in the Physical Education Institute in the North from the data from survey through questionnaire.

1.3 Study the result of studying the needs for developing the competency for research conduction in the faculty of Physical Education Institute in the North. The data comes from the gathered information from survey through the questionnaire.

1.4 The result of study on the attitude toward research conduction of the faculty of Physical Education Institute in the North. The data is taken from the survey through the evaluation form.

1.5 The result of study on the context of the Physical Education Institute in the North on research conduction. The data is gathered from the application of the SWOT Analysis.

1.6 The result of studying the model for developing the competency on research conduction at present outside the physical education institute and the Model that the physical education institute had employed in the past. The data is coming from the Focus Group Discussion.

From the study of the basic data, the researcher applies the result to be used as the guideline for drafting the Model for developing the competency for research conduction of faculty of Physical Education Institute in the North and the Manual that the researcher has set for the draft of the model for developing the competency on research conduction of the faculty of Physical Education Institute in the North. The model has three following components.

Component 1 is the input components which are the internal factors and the external factors.

Component 2 is the process for implementing the model by dividing the process into three phases as the followings.

- 1) Planning Phase
- 2) Training Phase
- 3) Evaluation Phase

Component 3 is the Driven Mechanics components for driving the model.

2. Bring the drafted model for developing the competency for conducting research of the faculty of Physical Education Institute in the North and the drafted Manual to seek for advice from the advisor to check the appropriateness.

3. Test the model for developing the competency for research conduction of the faculty of Physical Education Institute in the North and the Manual to make revision based on the suggestion of the thesis advisor.

4. Bring the model for developing the competency on research conduction of the faculty of Physical Education Institute in the North and the Manual to check the appropriateness by the experts.

**Step 2.2** Develop the model for developing competency for research conduction of the faculty of Physical Education Institute in the North.

### **Objectives**

To develop the model for developing competency for research conduction of the faculty of Physical Education Institute in the North.

### **Population and the sample group**

Study population is the faculty of physical education institute in Lampang campus.

The sample group of the research step can be divided into two groups as the followings.

Group 1 the sample group from the basic/primary field are three faculty members of Physical Education Institute Lampang Campus. They are taken through a purposive sampling and they are the willing samples to participate in the research.

Group 2 the sample group from the main test field are nine faculty members of Physical Education Institute Lampang Campus. They are taken through a purposive sampling. They are the people who are willing to participate in the research.

### **Tools used in the data gathering**

Tool number 3 is the evaluation form on the quality of the model.

Tool number 4 is the questionnaire on achievement that has four multiple choices.

### **Seeking for quality of the test form to measure the achievement**

#### **Checking the Validity**

The validity of the test of achievement, checked by five experts, is calculated from the consistency between the issues that need to be measured and the constructed questionnaire items through the calculation of Index of Congruence or IOC. The test of validity of the test on achievement shows that the IOC stands between 0.80 and 1.00.

### **Analysis of difficulty and discrimination power of the test**

The difficulty and discrimination power of the test can be analyzed by using the simple formula with the technique of ".27 percent" through the calculation of the computer program.

#### **Data analysis**

The data analysis is done by using the criteria to judge the per item difficulty of the test. The measurement of difficulty level (P) of the test on achievement shows that the value stands between 0.22 and 0.74, and the value of discrimination power (r) is between 0.21 and 0.72.

#### **Check of Reliability**

Checking the reliability of the test on achievement is done through the internal stability method called KR-20 through the calculation done by the computer program.

#### **Data analysis**

The data analysis utilizes the criteria for judging the reliability of the test through the internal reliability method called KR-20. From the check of Reliability of the test on achievement, it reveals that the reliability value stands at 0.77.

#### **Methods of study**

1. Test on basic field is accomplished by testing the developed training kit into a trial use with small sample group of three faculty members of Physical Education Institute Lampang Campus. In this step, the content validity will be measured as well as the methods used for development, duration, media, and evaluation of the appropriateness of the model.
2. Asking about the problem, obstacle, suggestion, and then revision of the training kit and the model according to the test on basic field.
3. Test on the main field is done by trying the developed training kit from the basic field test into a trial use with the sample group of nine faculty members of Physical Education Institute Lampang Campus who are taken through a purposive

sampling. They are all willing to participate in the research. In this step, besides evaluating the content, the methods used in the model and the evaluation of the appropriateness of the model, there is also data collection on quality by comparing the result of before and after the use of the model on the levels of knowledge and attitude.

4. Asking questions on problem, obstacles, suggestion, and then making revision of the Model based on the main test field results and then improve the model based on the discovery.

5. Improving the Model for developing the competency for research conduction of the faculty of Physical Education Institute in the North.

Summary of the guideline for studying based on Step 2. The development of the model for developing the competency for the faculty of Physical Education Institute in the North is done through the following steps.

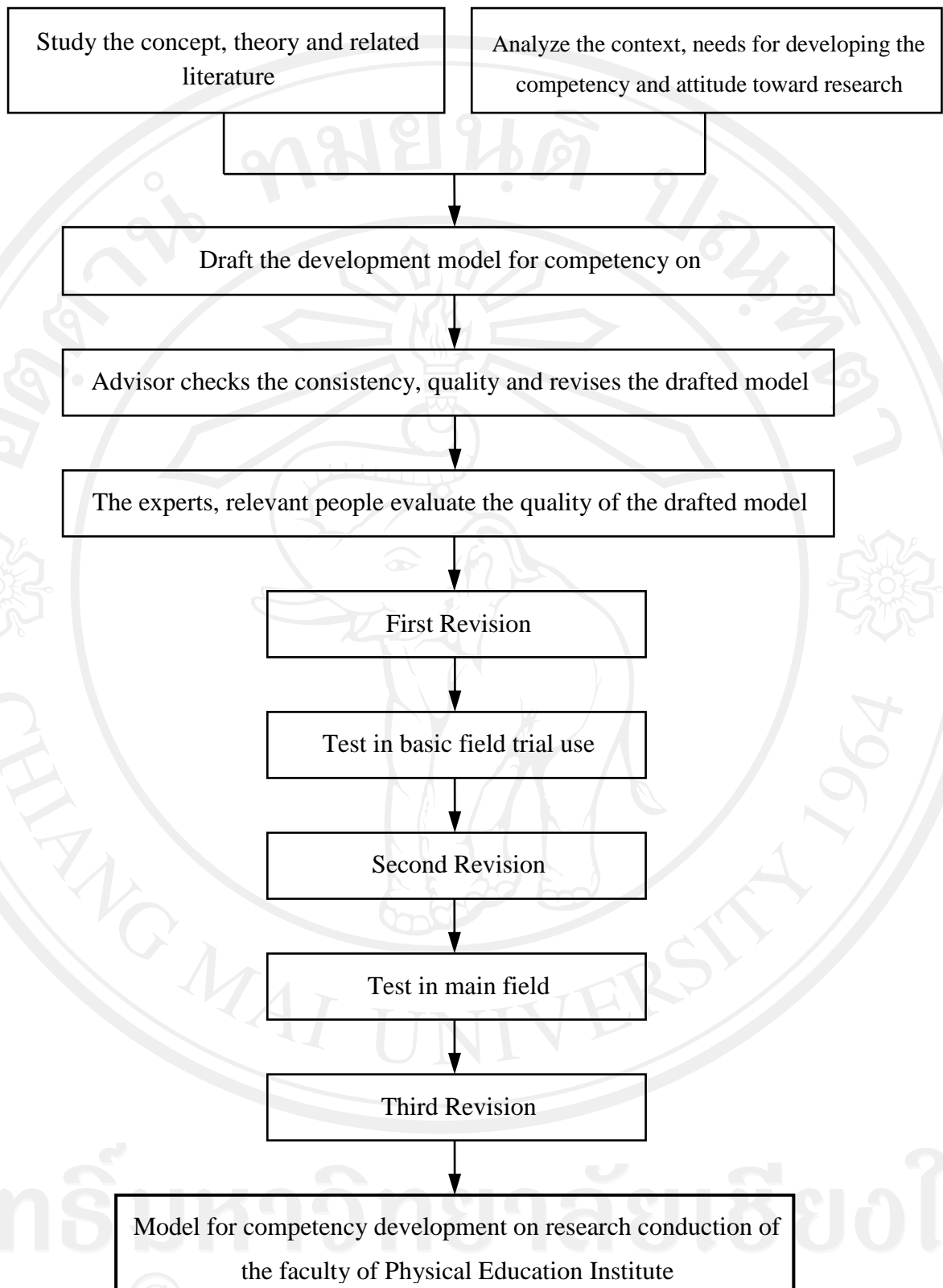


Figure 3.2 The guideline for study based on step 2

**Phase 3.** Study the efficiency of the development Model of competency on research conduction of the faculty of Physical Education Institute in the North

The study of efficiency of the Model for competency development on research conduction of the faculty of Physical Education Institute in the North has the following steps.

**Step 3 .1** The study of quality of the development model on competency on research conduction of the faculty of Physical Education Institute in the North by the stakeholders who are the administrators and the faculty of Physical Education Institute in the North who evaluate the quality of the development model for competency on research conduction.

### **Objectives**

To evaluate the quality of the development model for competency for research conduction of the faculty of Physical Education Institute in the North.

### **Population**

The population is the administrators and faculty of Physical Education Institute in the North.

### **Key informants**

The key informants are 46 administrators and faculty of Physical Education Institute in the North selected through a purposive sampling who are composed of (1) deans, deputy deans from central region (5 samples), (2) deputy deans, assistant deans of Physical Education Institute in the North (16 samples), and (3) the faculty of Physical Education Institute in the North who have experience in research conduction (25 samples).

### **Tools used for data collection**

The main tool used is the evaluation form on the quality of the development Model for competency on research conduction of the faculty of Physical Education Institute in the North.

Tool number 3 is the evaluation form on quality of the Model through the application of the tool of Somsak Phuvipadawat et al. (2013) which uses the questionnaire to evaluate six aspects: (1) on feasibility, (2) on appropriateness, (3) on adequacy, (4) on utility, (5) on agreement and (6) on propriety in term of morality. There is five rating scale from highest, high, moderate, little and the least.

### **Quality check of the tool**

In checking the validity, the researcher shows the questionnaire to five experts to check the content validity through the analysis of Index of Congruence (IOC) based on the experts' opinion. After the check by the experts, the researcher revises the questionnaire based on the suggestion of the experts.

The analysis of Index of Congruence or IOC is done by using the following formula.

$$IOC = \frac{\Sigma R}{N}$$

When IOC represents IOC value among the experts' opinion

R represents score on opinion

$\Sigma$  represents total or all scores

N represents number of experts

The check of validity of the questionnaire reveals that the value of IOC is between 0.80 and 1.00.

Checking the Reliability is accomplished by bringing the questionnaire for trial use with some 30 faculty of physical education institute who are not parts of the sample group. After that the researcher analyzes its reliability by measuring the Cronbach's Alpha Coefficient. The quality check of the tool produces the coefficient of the total reliability of the questionnaire at 0.75.

### **Data analysis**



The quality of the model can be considered from the average value, such as if it has the average value of 3.50 or higher, it is considered as appropriate. But if the value is lower than 3.50, it is in “need improvement” status. The interpretation of the average value for interpretation of the score is given as the followings (Boonchom Srisa-ard, 2002: 160-162).

Average value of 4.50 – 5.00 Have quality in the highest level

Average value of 3.50 – 4.49 Have quality in high level

Average value of 2.50 – 3.49 Have quality in moderate level

Average value of 1.50 – 2.49 Have quality in little level

Average value of 1.00 – 1.49 Have quality in the least level

The study of quality of the development Model for developing competency on research conduction of the faculty of Physical Education Institute in the North reveals that generally the Model has the quality in high level ( $\bar{X} = 4.03$ ).

**Step 3.2** To study the efficiency of the model

### **Objectives**

To study the efficiency of the model for developing the competency on research conduction of the faculty of Physical Education Institute in the North.

### **Population and the key informants**

Population is the faculty of Physical Education Institute in the North who participate in the training in the research project and the experts who evaluate the quality of the research work.

### **Key Informants**

These are 16 faculty of physical education institute who are taken by a purposive sampling procedure from four campuses. They are those who are willing to participate in the research and willing to develop their own competency in research conduction.

The criteria to select the qualification of people who participate in the training according to the model for developing competency for research conduction of the faculty of Physical Education Institute in the North. They are as the followings.

1. The participants of the training have gained knowledge on research conduction and must achieve scores from the exercise/test that pass the criteria of 70 percent. In this research, the researcher found that three participants fail to reach such limit.
2. The participants of the training must attend the training not less than 80 percent of the training hours. In this research, one participant fails to conform to such criterion.
3. The participants must be able to conduct a research and complete it within due time. In this research, there are three participants who fail in this requirement.

From the criteria for judging the qualification of people who participate in the training, it is found that there are nine people who pass such criteria.

#### **Tools used for data collection**

Tool number 2 is the questionnaire on the attitude toward the research conduction (evaluation of attitude) by allowing the sample group to do the self-assessment on attitude.

Tool number 4 is the evaluation on the achievement (evaluation of knowledge). The researcher will do the evaluation of the sample group.

Tool number 5 is the evaluation form on the quality of the research report (evaluation of skill) by the experts who evaluate the research quality. Three experts will check the research reports. The experts are from those from the networks of researcher development of Physical Education Institute in the North which consist of Assoc. Prof. Sudyod Chomsahai, Assoc. Prof. U-maporn Kong-u-rai, Assoc. Prof. Dr. Pairoh Aungsusuknarumol and Dr. Sriprapai Inchaithep.

#### **Data analysis**

##### **On knowledge**

The data from achievement of the training on developing competency on research conduction of the faculty of Physical Education Institute in the North is analyzed through the analysis of means value ( $\bar{X}$ ), standard deviation (S.D.) of the scores of the test through the analysis of non-parametric statistic of Wilcoxon Matched-Pairs Signed Rank Test.

### **On Attitude**

The data on attitude toward the research of the faculty of Physical Education Institute in the North will be analyzed with the analysis of means ( $\bar{X}$ ) and standard deviation (S.D.) of the evaluation on attitude through the analysis of nonparametric statistic of Wilcoxon Matched-Pairs Signed Rank Test.

### **On Skill**

The researchers analyzes the research report of the faculty of Physical Education Institute in the North which has been done and evaluates it by using the quality evaluation form of research report with a five rating scale. The data will be analyzed by means ( $\bar{X}$ ) and standard deviation (S.D.) through the analysis of nonparametric statistic of Wilcoxon Matched-Pairs Signed Rank Test.

### **Method of study**

1. The researcher prepares an invitation letter to the Deputy Dean of each of four campuses in order to invite the sample group to attend the training for developing the competency for research conduction.
2. The researcher brings the model for developing the competency for research conduction of the faculty of Physical Education in the North to apply in developing the competency of research conduction of the faculty of Physical Education Institute Lampang Campus.
3. The researcher supervises, monitors, and gives advice, suggestion and assistance to the sample group in research conduction after the training during the three phases until the completion of the research.

4. The researcher evaluates and analyzes the findings and then reports the result of developing the competency for research conduction of the faculty of Physical Education Institute in the North on knowledge, on attitude and on skill.

### **Research method**

The design of the research is an experimental design with One Group Pre-test Post-test Design. There will be pre-test and post-test. The details of research implementation will be given as the followings.

1. Planning Phase has the implementation steps as what follows.
  - 1.1 Coordination phase with the Dean of the physical education institute.
  - 1.2 Appointment of the committee of the researcher network in the Physical Education Institute in the North.
  - 1.3 Preparation of the letter to appoint the committee for implementation.
  - 1.4 Preparation of the invitation letter to invite the sample group to attend the training.
  - 1.5 Preparation for the material for training.
  - 1.6 Preparation for the venues and equipment.
  - 1.7 Preparation for the training schedule
  - 1.8 Invitation for the trainers.
2. Training Phase has the following steps.
  - 2.1 The Pre-test to check the knowledge and evaluate the attitude toward research conduction.
  - 2.2 Implementation of the training by using the model with the faculty of Physical Education Institute in the North according to the contents, the identified schedules, and conduction of research. After the training, there is the process for monitoring, giving advice, and consulting with the researchers. The monitoring will be done in three phases as the followings.

Phase 1 is to give advice, consultation to researcher, and evaluation on the research work on the title, background and the importance of research problem, objective of research, definition of terms, written review of literature, and research conceptual framework.

Phase 2 is to give advice, consultation to researcher, and evaluation on the research that relate to the construction of the tools to check the quality, procedure to select the sample group, sampling taking, and statistics used in data analysis.

Phase 3 is to give advice, consultation to researcher, evaluation on the research on data analysis, and production of the research report.

Remark: The content to be monitored in each phase can be adjusted appropriately according to the ability level of the sample group.

3. Evaluation Phase has the steps for implementation as what follows.

3.1 On Knowledge. The researcher calculates the scores received from the test of achievement (60 items) before and after the training to analyze the means ( $\bar{X}$ ) and standard deviation (S.D.) by analysis with non-parametric statistic of Wilcoxon Matched-Pairs Signed Rank Test to compare the scores of knowledge before and after the training and then compare with the standard criteria. The identification to pass the knowledge criteria must be at a “good level” or higher.

The criteria for interpreting the result of score from doing the test are as the followings (Stufflebeam, 2006).

93 percent or 56 correct items or above	Excellent
68 - 92 percent or 41 – 55 correct items	Very Good
50 - 67 percent or 30 – 40 correct items	Good
25 - 49 percent or 15 – 29 correct items	Moderate/fair
Below 25 percent or 15 correct items	Need improvement

3.2 On Attitude. The researcher calculates the scores from the questionnaire before and after the training to work on the means ( $\bar{X}$ ) and standard deviation (S.D.) through the analysis of nonparametric statistic of Wilcoxon Matched-Pairs Signed Rank Test in order to compare the attitude before and after the training. And then the researcher compares the calculation against the standard criteria by identifying the criteria of passing on the attitude on research conduction that must be in a “high” level or higher.

The criteria of interpreting the score of attitude are as the followings (Boonchom Srisa-ard, 2002: 160-162).

Mean value 4.50 – 5.00	Have positive attitude toward research conduction at the highest level
Mean value 3.50 – 4.49	Have positive attitude toward research conduction at high level
Mean value 2.50 – 3.49	Have positive attitude toward research conduction in moderate level
Mean value 1.50 – 2.49	Have positive attitude toward research conduction in little level
Mean value 1.00 – 1.49	Have positive attitude toward research conduction in the least level

3.3 On Skill. The researcher brings the result of evaluating the research report to analyze to collect the mean values ( $\bar{X}$ ) and standard deviation (S.D.) through the analysis of nonparametric statistic of Wilcoxon Matched-Pairs Signed Rank Test in order to compare the research quality (Skill) with the identified criteria and compare it with the standard criteria. The identification of criteria of pass the quality of the research skill is in the quality level of “moderate” level or higher.

The criteria for interpreting the result of evaluating the report quality are as the followings (Office of the Education Council, 2009).

Evaluation score between 3.21 and 4.00 means High quality

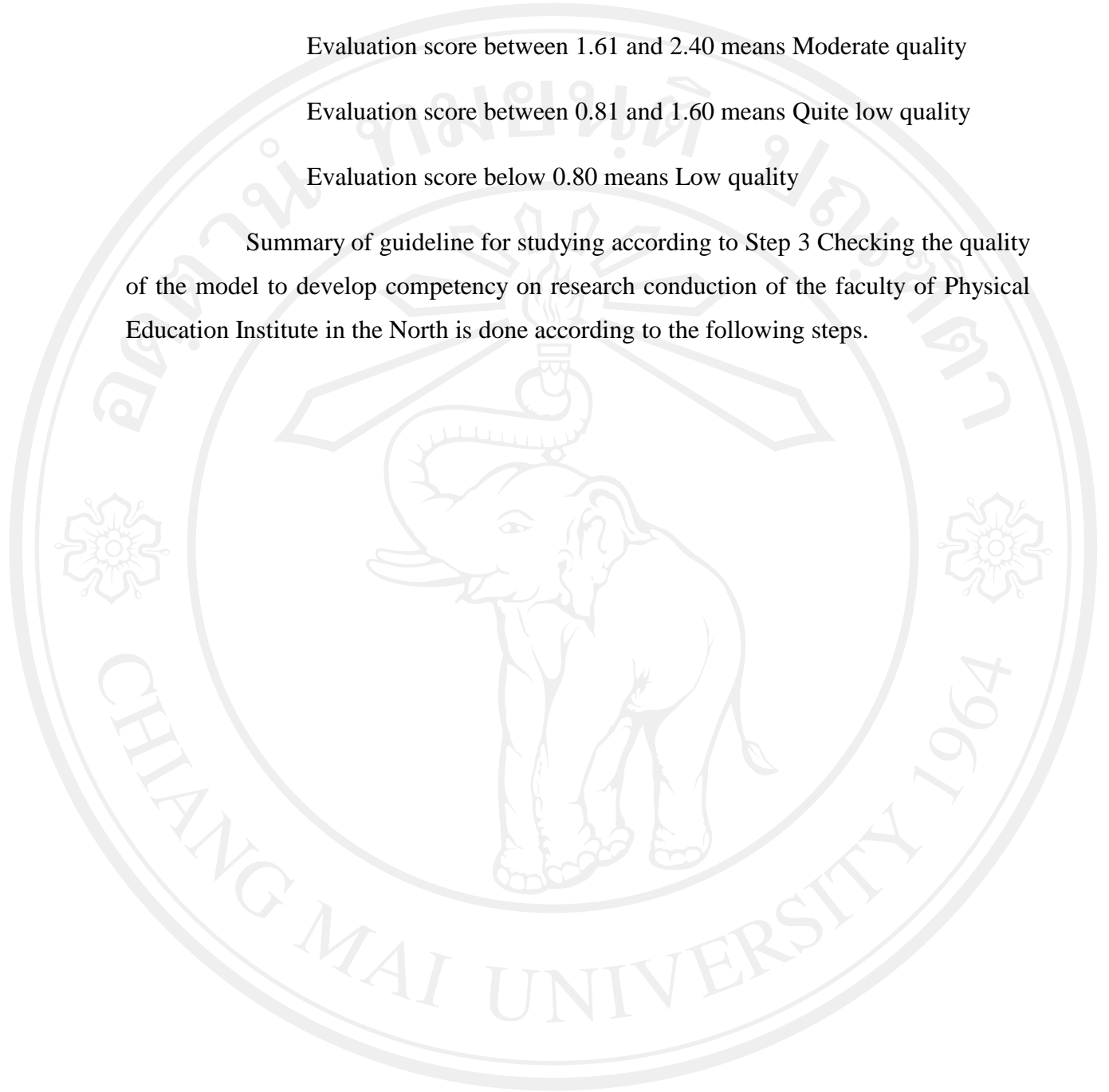
Evaluation score between 2.41 and 3.20 means Quite high quality

Evaluation score between 1.61 and 2.40 means Moderate quality

Evaluation score between 0.81 and 1.60 means Quite low quality

Evaluation score below 0.80 means Low quality

Summary of guideline for studying according to Step 3 Checking the quality of the model to develop competency on research conduction of the faculty of Physical Education Institute in the North is done according to the following steps.



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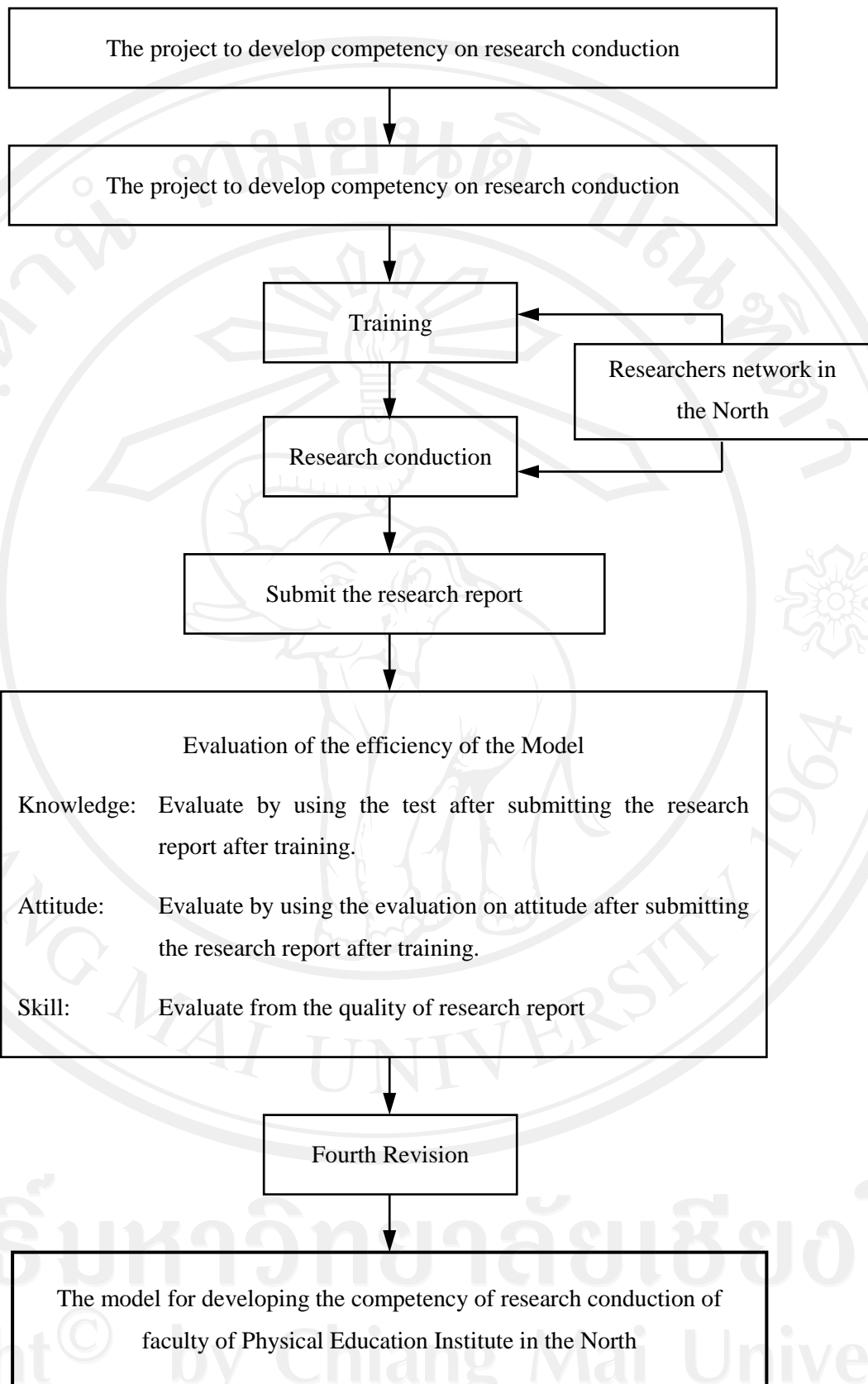


Figure 3.3 The guideline for study based on step 3