

### **Chapter 3**

#### **Research Methodology**

The study on the Model of learning management skills development to enhance critical thinking for Thai language lecturers in Rajamangala University of Technology Lanna .The research is classified into three phases as the followings.

#### **1. Research Phase 1: Studying the Condition of Teaching and Learning Arrangement in the Course of Thai Language 1**

##### **Population**

This research involves 22 Thai Language lecturers of Rajamangala University of Technology Lanna.

##### **Samples**

The group of samples is taken among the bachelor degree students in the course of Thai Language 1, Semester 2 of academic year 2009 of Rajamangala University of Technology Lanna. The groups of sample are taken through a quota sampling of the members of one classroom from each campus (out of six campuses). The total number of sample groups is six classrooms or a total of 180 students.

##### **Tools used in the research phase 1**

1. The questionnaire on the instructional condition of the course of Thai Language 1, and the opinion of the lecturers who teach the Thai Language towards the promotion of critical thinking.

2. The questionnaire on the learning management in the course of Thai Language 1 and the opinion or attitude of the students toward the teaching and learning of the Thai Language 1 Course.

Both questionnaires are divided equally into three parts.

1. General data about lecturers of Thai Language 1 Course and their students.

2. Data about teaching and learning condition in the course of Thai Language 1 regarding the introduction to the lessons, summary of the lessons, result measurement and evaluation, opinion toward the critical thinking, and the stated need to promote critical thinking (in Likert's five rating scales).

3. Open-ended questions which are also covering the suggestions toward the learning management in the course of Thai Language 1 in order to promote critical thinking.

In improving the quality of the two tools the following methods are used.

1) The researcher submits the produced questionnaires to the advisors to check their correctness and then the questionnaires to three experts on the curriculum and instruction, promotion of critical thinking, as well as measurement and evaluation to check the validity of the evaluation form by considering its cohesiveness against the evaluation list and the appropriateness of language used. The

selection criterion for the listed item is that they have the IOC (Index of Consistency) above 0.5. The result of checking reveals that the list has an IOC score standing between 0.60 and 1.00.

2) The tools are also used among the student (controlled) group who are not the sample group: 30 students and 10 Thai Language lecturers at Rajamangala University of Technology Thanyaburi and Rajamangala University of Technology Suwannaphum Suphanburi Campus.

3) The researcher applies the questionnaires to the test and then measure their results to find the reliability of the questionnaire through a calculation of their Cronbach's alpha coefficients (cited in Kiatsuda Srisuk, 2006: 161). The calculated reliability of the questionnaires on the opinion of the Thai Language lecturers and the students for the whole versions stand equal to 0.89 and 0.92 respectively.

4) The language utilized in the questionnaires is revised into better wording for least possibility of misunderstanding in data gathering.

### **Data gathering**

The researcher sends the questionnaires to 22 Thai Language lecturers and students who are the sample group from the six campuses of Rajamangala University of Technology Lanna in Chiang Mai, Chiang Rai, Lampang, Tak, Phitsanulok and Nan Provinces. These samples are requested to send back their responses to the questionnaires within 2 weeks for quick data analysis.

### **Data analysis**

1. Quantitative data, which are means and standard deviations, produce certain results on the opinion on learning management, attitude and need to promote the critical thinking of Thai Language lecturer and the students.

By identifying the interpretation of the meaning in the Likert's five rating scale as the followings (citing Boonsong Nilkaew, 1998: 146).

<b>Mean</b>	<b>Meaning</b>
4.50 - 5.00	the level of practice/importance/need at the "highest level"
3.50 – 4.49	the level of practice/importance/need at "high level"
2.50 – 3.49	the level of practice/importance/need at "moderate level"
1.50 – 2.49	the level of practice/importance/need at "low level"
1.00 - 1.49	the level of practice/importance/need at "the lowest level"

2. Qualitative data. The researcher brings the data from the open-ended questions Part 3 to analyse, to arrange the comparison group, to measure critically, to interpret the meaning to evaluate the incurred situation, and then to summarise the data.

## **2. Research Phase 2: Development of the Model to Develop Learning Management Skills that Enhance Critical Thinking for the Thai language Lecturers.**

2.1 The researcher analyses the results of studying the learning management condition of the Thai Language lecturers and students towards the promotion of critical thinking, including the suggestion to the promotion of critical thinking

(research findings from the research Phase 1) in order to be the guideline of developing the model for developing the learning management skill that enhances critical thinking.

2.2 The researcher studies the secondary data of the literature related to the theories and concepts of developing learning management skill of lecturers, training and collaborative learning, reflective approach, including the other related researches.

2.3 The researcher prepares a draft of the development through the synthesis of the concepts, theories of developing learning management of the lecturers, training, collaborative approach, reflective approach, including related researches and the findings of the study on the learning condition of learning in the course of Thai Language 1. The opinions and the needs to promote critical thinking of lecturers and students are incorporated through the development model which consists of three steps as the followings. These steps are (1) the step on training, which is composed of two sub-steps, i.e., self-directed training and workshop, (2) the step on monitoring and evaluation in the classroom, which is composed of three sub-steps, i.e., the step for planning, implementation and observation, the step for reflection, and (3) the step of summary and evaluation.

2.4 The researcher brings the draft of the development model of learning management that enhances critical thinking skill and then presents it to the advisor of the thesis for checking and advising on the draft's appropriateness.

2.5 The researcher presents the draft of the development model checked by the advisor to five experts and specialists on curriculum and instruction, the development of learning management skill, and the promotion of critical thinking. These experts assess the draft for its feasibility on four aspects, which are appropriateness, correctness and coverage, benefits, and variability. This assessment shows that the level for the feasibility is in a "high" level ( $\bar{X} = 3.5$ ) for all items.

2.6 The researcher revises the plan for the development of learning management skill that enhances critical thinking following the experts' advice.

2.7 The researcher tests the development model of learning management skill into a trial with 2 Thai Language lecturers in the semester of 3/2009 between 29 March 2010 and 23 April 2010 in order to study the variability before the real application.

### **Sample group**

Two Thai Language lecturers and some 24 students (from two classrooms) of Rajamangala University of Technology Lanna are willing to participate in trial use the development model in the semester of 3/2009.

### **Tools used in the research phase 2**

1. The evaluation form on the development model of learning management skill for the experts is set in a Likert's five rating scale on four aspects which are on its appropriateness, correctness and coverage, benefits and variability.

1.1 The researcher brings the evaluation form on the development model of the learning management skill from the experts to the advisor to recheck for further revision.

1.2 The researcher then recheck the validity of the evaluation form by considering on the cohesiveness/relationship to the list that have been evaluated, the

appropriateness of the language used by considering the criteria for selecting the list items which have the IOC above 0.5 then submits to three experts on curriculum and instruction, on learning management development and on evaluation. The results of this evaluation show that the items listed reach the IOC between 0.60 and 1.00.

1.3 Finally the researcher revises the evaluation form according to the advice of the experts then improves it before further application.

2. The self-directed learning manual on the learning management that enhance critical thinking for Thai Language lecturers.

2.1 The researcher studies the secondary data on the concepts, theories, and researches related to training, and then constructs the self-directed learning manual and development of critical thinking.

2.2 The researcher creates a draft for training manual consisting of introduction, guideline to use the manual and content of three components, which consists general knowledge on critical thinking, development of critical thinking and learning management that enhances critical thinking.

2.3 The researcher brings the self-directed learning manual to the advisor to check for revision then presents it to five experts and specialists on curriculum and instruction, on development of learning management skill and on the promotion of critical thinking to check and advise for correctness and appropriateness of the self-directed learning manual. The findings show that the manual is appropriate as the score stands above the high level ( $\bar{X} = 3.5$ ).

2.4 The researcher improves the self-directed learning manual according to the advice of the experts.

3. The test on the general knowledge on the learning management that enhances critical thinking for the Thai Language lecturers.

3.1 The researcher creates a test form using the contents about the general knowledge on learning management that enhances critical thinking. The 45 questions are multiple (four) choices for the Thai Language lecturers that is in response to the contents of three learning units in the self-directed learning manual.

3.2 The researcher brings the constructed test form to the advisor for advice on improvement before revealing it to three experts or specialists (on curriculum and instruction, on promotion of critical thinking and on measurement and evaluation) to check the validity of the components to be measured, the appropriateness of the contents and the language used. The result of checking the validity of the components that need measurement, based on the selection criteria of the items, shows that the average IOC is higher than 0.5. To be exact the finding show that the IOC stands between 0.60 and 1.00, and 38 items or questions are taken in as the final result.

3.3 The researcher trial the test on general knowledge on the learning management that enhances critical thinking with 10 Thai Language lecturers of Rajamangala University of Technology Thanyaburi and Rajamangala University of Technology Suwannaphum Suphanburi Campus in order to analyse the data to find the difficulty level and discrimination power and the reliability of the test by using the formula of Kuder-Richardson or "KR 20". Setting the selection criteria of the test (difficulty level between 0.20 and 0.80, the discrimination power above 0.20, and the



test reliability of 0.71) (Kiatsuda Srisuk, 2006: 165), the researcher gathers the last 30 items in the test form.

#### 4. The evaluation method of the self-directed learning manual.

4.1 The researcher prepares a evaluation draft of self-directed learning manual with the five rating scale and divides the evaluation into three lists, which are on the format of publication, on the content and the application, and on open-ended questions.

4.2 The researcher submits the evaluation form to the advisor to check, then presenting it to three experts on curriculum and instruction, on promotion of critical thinking and on measuring and evaluation to the validity of the evaluation form for consideration on the consistence of the evaluated list, the appropriateness of the language used, on the selection criteria of the items with IOC value above 0.5. The experts' assessment findings show that the IOC stands between 0.60 and 1.00.

4.3 The researcher improves the evaluation form according to the experts' advice in order to make the evaluation form with much better shape before actual application.

#### 5. Workshop plan for arranging the workshop for the Thai Language lecturers.

5.1 The researcher studies the secondary data on the concepts, theories, related research on training, development of critical thinking and drafting the workshop plan that consists of title, objectives, content, activities, media, and evaluation methods.

5.2 The researcher submits the draft of workshop plan to the advisor to check and advise, and then presents it to the five experts on curriculum and instruction, on development of learning management skill and on the promotion of critical thinking to recheck for correctness and appropriateness. This assessment shows that the meeting plan is appropriate in more than "high" level ( $\bar{X}=3.5$ ).

5.3 The researcher revises the workshop plan according to the advice of the experts.

#### 6. The evaluation form of the workshop

6.1 The researcher prepares a draft of evaluation form on workshop into a five rating scale that divides the evaluation into two parts, which is on the knowledge gained from the meeting and on the meeting arrangement, and on the open-ended questions.

6.2 The researcher brings the evaluation draft form of the workshop to the advisor for advice and then submits it to three experts on curriculum and instruction, on promotion of critical thinking and on the measuring and evaluation for the consideration on the consistency of the evaluated list, the appropriate of the used language (the selection criterion is IOC value higher than 0.5. The result of this checking shows that the average IOC value stands between 0.60 and 1.00.

6.3 The researcher revises the evaluation form on the workshop according to the experts' advice.

7. Evaluation form on learning management plan that enhances critical thinking for experts to use in evaluating such learning management plan in the course of Thai Language 1 of the Thai lecturers who arrange it in form of a workshop.

7.1 The researcher sets a draft of the evaluation form on the learning management plan that enhances critical thinking in Likert's five rating scale. The evaluation is divided into six areas, which are the component on learning management plan, learning objectives, contents, learning activities, learning media, and measurement and evaluation.

7.2 The researcher brings the evaluation form to the advisor to recheck for revision before sending it to three experts on curriculum and instruction, on promotion of critical thinking and on measuring and evaluation to check for the validity of the evaluation form. This check is done through consideration of the consistency of the evaluated list, of the used language, and of the selection criteria of items having IOC value above 0.5. The result of this assessment shows that the IOC value of the items is standing between 0.60 and 1.00.

7.3 The researcher revises the evaluation form according to the experts' advice in order to improve the usable version of the evaluation form before the actual application.

8. The observation form on learning management is for observing the learning management of the Thai Language lecturers.

8.1 The researcher identifies the structure of the events and the behaviours being observed.

8.2 The researcher creates the observation form on learning management. This form divides the behaviour of the lecturers and students in Likert's five rating scales, which are "very good", "good," "moderate," "little," and "very little" levels.

8.3 The researcher brings the observation form on learning management that has been constructed to the advisor in order for advice in correctness and appropriateness then submits it to three experts on curriculum and instruction, on promotion of critical thinking and on measuring and evaluation to check the validity of the evaluation form through consideration on the consistency of the evaluated items, appropriateness of the language used. Based on the selection criteria of the listed items (with average IOC value above 0.5) the findings show that all listed item have IOC values between 0.60 and 1.00.

8.4 The researcher revises the observation form of the learning management according to the advice of experts then utilise it for a trial with the control group students who are not the sample group in the course of Thai Language 1.

9. Record form of learning management for events done by Thai Language lecturers

9.1 The researcher identifies the structure of the events and behaviours that are going to be recorded.

9.2 The researcher constructs the record-keeping for learning management events in the open-ended record form, which is divided chronologically in teaching and learning activities in the learning plan. This record form consists of the steps of introduction to the activities, of presentation to the events, of training to

think individually, of training to think in sub-groups, of summary and discussion, and of evaluation for thinking processes.

9.3 The researcher submits the constructed record form of learning management to the advisor and three experts and specialists on curriculum and instruction, promotion of critical thinking to check for its correctness and appropriateness.

9.4 The researcher improves the record form of learning management event based on the advice of the advisor and experts then puts it into a trial to record the classroom activities that are not the sample group in the course of the Thai Language 1.

10. The reflection form after the learning management sessions for the Thai Language lecturers.

10.1 The researcher identifies the structures of the event that are going to be recorded.

10.2 The researcher constructs the record form after the learning management session in form of the open-ended event record, which is divide into two parts, i.e., the teaching and learning events and the things to be improved in the next learning session.

10.3 The researcher submits the constructed record form after the learning session to the advisor and three experts on curriculum and instruction, on promotion of critical thinking in order to check for correctness and appropriateness.

10.4 The researcher prepares revision according to the advice of the advisor and experts and prepares it for next application.

11. The measurement form on critical thinking. This form is developed from the measurement form on critical thinking by Penpisut Nakamanurak (1994). This for consists of the questions with multiple choices (three choices) that cover the thinking process skill on six aspects, which are identifying the problems, gathering data, judging the reliability of the data and discriminating the data, formulating the assumptions or hypothesis, drawing conclusion, and evaluating the summary.

11.1 The researcher constructs the measurement form according to the set structured questions with multiple (three) choices. Each question has only one correct answer: one score for correct answer and 0 for wrong answer. The number of the questions is 60.

11.2 The researcher presents the form to the advisor for advice and revision then brings it to three experts on promoting critical thinking and on measurement and evaluation to check for the validity of the components that need to be measured, the appropriateness of the content and the language used by using the selection criteria of IOC list above 0.5. The result of checking the validity of the component reveals that the IOC is standing between 0.60 and 1.00. The form also has 50 usable items in the measurement form.

11.3 The researcher bring the measurement form on critical thinking to have a trial test with 30 bachelor degree freshmen students who are not the sample groups in order to find the difficulty value, discrimination power and the reliability value of the measurement by using the method of Kuder-Richarson (K.R.20). The criteria for the test criteria are the difficulty level standing between 0.20 and 0.80, the

discrimination power above 0.20 (Kiatsuda Srisuk, 2006:165), and the reliability value at 0.83. These criteria produce 42 items or questions for the measurement form on critical thinking.

12. The questionnaire to measure the opinion or attitude toward the learning management that enhances critical thinking. This questionnaire is classified into five aspects, which are on the lecturers behaviour, on the contents, on the learning activities and learning media, on measurement and evaluation, and on attitude toward the whole picture of the learning management (stated in five rating scales); it also has some open-ended questions.

12.1 The researcher constructs the questionnaire to gather opinion stated in a five rating scale, which are the level of “highest,” “high,” “moderate,” “low” and “lowest” (added with open-ended questions on the last part).

12.2 The researcher brings the constructed questionnaire to the thesis advisor for checking and advice for revision before presenting it to three experts on curriculum and instruction, on promotion of critical thinking and on measurement and evaluation to check for validity, correctness and appropriateness of the use of language and questions. The result of checking the validity of the components that need to be measured, by using selection criteria of IOC for items above 0.5, shows that the IOC lies between 0.60 and 1.00.

12.3 The researcher tests the questionnaire into a trial test with some 30 students who passed the course of the Thai Language 1 in order to find the reliability value through the use of Cronbach’s alpha coefficient (Kiatsuda Srisuk, 2006:161). The trial test produces a reliability equal to 0.82 then the questionnaire is further revised before actual application.

13. A record form of group meeting to summarise and evaluate the learning management and development model of learning management that enhances critical thinking.

13.1 The researcher identifies the structure of events that need to be recorded in the group meeting.

13.2 The researcher constructs the meeting record. The record consists of the open-ended record that divides chronologically the samples’ opinion on the critical thinking, the learning management plan, learning management, and development model that enhances critical thinking.

13.3 The researcher brings the constructed meeting record to the thesis advisor and three experts on curriculum and instruction, promotion of critical thinking to check for correctness and appropriateness and then improves the record before further use.

### **Data gathering**

1. The researcher submits the test form on general knowledge on learning management that enhances critical thinking to the lecturers who participate in trial use the development model to practice before they study the self-directed learning manual by themselves.



2. The researcher submits the self-directed learning manual to the lecturers who participate in trial use the development model and allows them to study the manual for a week.

3. The researcher implements the tests by testing the general knowledge on learning management that enhances critical thinking after studying the self-directed learning manual with the same test form and ask the lecturers to evaluate the self-directed learning manual.

4. The researcher cooperates to arrange the dates and time to hold the meeting with the Thai language lecturers who participate in trial use the development model at Rajamangala University of Technology Lanna, invites the knowledgeable trainers, and prepares the venue, food and documents for the meeting.

5. The researcher implements the workshop meeting to develop the Thai Language lecturers on “learning management that enhances critical thinking” according to the itinerary of the workshop meeting plan on 15 to 16 March 2010 at the Conference Room of Liberal Arts Building.

6. After the meeting with the lecturers who participate in the workshop, the researcher evaluates the workshop results with the evaluation form of the meeting.

7. The researcher brings the learning management plan to enhance critical thinking in the course of Thai Language 1 that the lecturers who participate in the research project have produced together. Then this plan is submitted it to one expert on promotion of critical thinking to evaluate. The evaluation is done over the evaluation form on the constructed learning management. Afterward the researcher present the results of the evaluation in a meeting together among the lecturer group in order to produce a revision of the learning management plan together according to the advice of the experts before bringing it to use in further steps.

8. The researcher joins a session to produce the learning management plan with the Thai Language Lecturers who participate in trial use the development model on 24 March 2010 between 9 and 12 am at Conference Room of Liberal Arts Building. The monitoring step is accomplished in the classroom in order to understand the details, to prepare documents and tools for experiments, to utilize measurement form on thinking before and after the class session, to set plan to participate in the observation of the learning management, and to discuss and exchange ideas among the participants after the learning management.

9. The lecturers who participate in trial use the development model test the developed measurement form on critical thinking before the learning management with the sample students.

10. The lecturers who participate in trial use the development model implement the learning management according to the learning management plan that enhances critical thinking in the course of Thai Language 1; the number of plan is five plans with each plan has three hours with the student samples. The lecturers from the same campus participate in the observation of the learning management, and discuss to exchange opinions after the learning management training is done.

11. Lecturers who participate in trial use the development model are tested by using the measurement form on critical thinking with the previous or old measurement form after the learning; the test also enquires the sample student on their opinions/attitudes toward the learning management that enhances critical thinking.

12. The researcher cooperates, sets appointments for dates and time for the meeting to summarize and evaluate the results of the learning management of the Thai Language lecturers who participate in trial use the development model.

13. The researcher opens the group meeting with the Thai Language lecturers who participate in trial use the development model on 30 April 2010 from 9 to 12 am at the at Conference Room of Liberal Arts Building in order to summarize and evaluate their learning management, their attitudes, and their suggestions including their opinion towards the developed model.

### **Data Analysis**

In this step of the research, this research collects the derived data from the data collection activities to be analyzed as the followings.

1. Quantitative data by using the basic statistics such as means and standard deviations.

1.1 The researcher compares the average scores of the samples' (lecturers) general knowledge on learning management that enhances critical thinking before (pre-test) and after their studying the self-directed learning manual (post-test)

1.2 The evaluation of the self-directed learning manual and the meetings is done through their means and standard deviations through the identification of the interpretation of the meaning according to Likert's 5 rating scale (cited in Boonsong Nilkaew 1998: 146).

<b>Means</b>		<b>Definition</b>
4.50 - 5.00		Agree at the highest level
3.50	– 4.49	Agree at high level
2.50	– 3.49	Agree at moderately level
1.50	– 2.49	Agree at a little level
1.00 - 1.49		Agree at the least level

1.3 The evaluation of the quality of the preparation of learning management plan that enhances critical thinking by the lecturers who participate in the research project is made from the workshop meeting by the experts who are the ones who identify the criteria for the interpretation as the followings.

<b>Score</b>	<b>Meaning</b>
100-125 (higher than 80%)	Very good
88-99 (70 -79%)	Good
75-87 (60 – 69%)	Fair
25-74 (below 60%)	Need Improvement

1.4 The observation form on the learning management behaviour of the learning management in the classroom is set into five rating scale. The interpretation of the behaviour is observed in this five rating scale as the followings.

<b>Means</b>	<b>Definition</b>
4.50 - 5.00	Lecturers/students show behaviour in very good level
3.50	– 4.49 Lecturers/students show behaviour in good level
2.50	– 3.49 Lecturers/students show behaviour in fair level
1.50	– 2.49 Lecturers/students show behaviour in low level
1.00 - 1.49	Lecturers/students show behaviour in very low level

1.5 The comparison between the average score of critical thinking before (pre-test) and after the learning, the sample group of the students (post-test) is accomplished with the statistics Student's t-test.

1.6 The calculation of the means and standard deviations of the students' attitude toward the learning management is measured by identifying the interpretation using the criteria of five rating scale of Likert (Boonsong Nilkaew, 1998: 146).

Means		Meaning
4.50 - 5.00		Agree at the highest level
3.50	- 4.49	Agree at high level
2.50	- 3.49	Agree at moderately level
1.50	- 2.49	Agree at a little level
1.00 - 1.49		Agree at the least level

2. Qualitative data by the researcher gathers the data from observation, opinion, discussion, and suggestions of the lecturers and students. The data gathered will be analysed in form of contents, comparisons, criticisms, interpretation and evaluation of the events, and summary or conclusion.

### **3. Research Phase 3: The Result of Using the Development Model of Learning Management Skills that Enhance and Develops Critical Thinking**

#### **Sample group.**

Some seven Thai language lecturers of Rajamangala University of Technology Lanna from three campuses who are willing to participate in the research project and 192 (freshman) bachelor degree students taken from seven classes by a purposive sampling method.

#### **Tools used in the research phase 3**

For the tools used in the Research Phase 3, the researcher chooses the tools constructed in research phase 2. The improvement of some tools after the experiment used in research phase 2 would be explained as the following:

##### **1. Steps of training**

1. The self-directed learning manual is revised to incorporate better language and to have clearer summary on each context according to the suggestion of the participant lecturers who had uses it in research phase 2. The learning management plan that had been derived from the experiment step of the model is set to be the sample of the supplementary learning management plan.

2. The workshop plan is adjusted to have invitation of the knowledgeable trainers outside the university. These trainers who have experiences on promoting critical thinking in the course of the Thai Language 1 are invited to give lecture and to join discussions with the lecturers and students.

##### **2. The Monitoring step in the classroom**

1. The observation form on learning management is revised on the language use to be comprehensible in the observation more on each aspect according to the

advice from the participants and lecturers who participate in the experiment used in the research phase 2.

### **Data gathering**

1. The researcher submits the test form on general knowledge of learning management that enhances critical thinking to the lecturers who participate in the research project to practice before they study the self-directed learning manual by themselves.

2. The researcher sends the self-directed learning manual to the lecturers who participate in the research project and allows them to study the manual individually for two weeks.

3. The researcher implements the tests by testing the general knowledge of learning management that enhances critical thinking after studying the self-directed learning manual with the same test form and ask the lecturers to evaluate the self-directed learning manual.

4. The researcher cooperates to arrange the dates and time to hold the meeting with the Thai language lecturers who participate in the research project at Rajamangala University of Technology Lanna, invites the knowledgeable trainers, and prepares the venue, food and documents for the meeting.

5. The researcher implements the workshop meeting to develop the Thai language lecturers on “learning management that enhances critical thinking” according to the itinerary of the workshop meeting plan on 10 to 11 May 2010 at Conference Room of “Wittaya Borikan Building.”

6. After the meeting with the lecturers who participate in the workshop, the researcher evaluates the workshop results with the evaluation form of the meeting.

7. The researcher brings the learning management plan to enhance critical thinking in the course of Thai Language 1 that the lecturers who participate in the research project have produced together. Then this plan is sent it to three experts on promotion of critical thinking to evaluate. The evaluation is done over the evaluation form on the constructed learning management. Afterward the researcher present the results of the evaluation in a meeting together among the lecturer group in order to produce a revision of the learning management plan together according to the advice of the experts before bringing it to use in further steps.

8. The researcher joins a session to produce the learning management plan with the Thai language lecturers who participate in the project on 27 May 2010 between 9 and 12 am. The monitoring step is accomplished in the classroom in order to understand the details, to prepare documents and tools for experiments, to utilise measurement form on thinking before and after the class session, to set plan to participate in the observation of the learning management, and to discuss and exchange ideas among the participants after the learning management.

9. The lecturers who participate in the research project test the developed measurement form on critical thinking before the learning management with the sample students.

10. The lecturers who participate in the research project implement the learning management according to the learning management plan that enhances critical thinking in the course of Thai Language 1; the number of plan is seven plans by each plan has three hours with the student samples. The lecturers from the same



campus participate in the observation of the learning management, and discuss to exchange opinions after the learning management training is done.

11. Lecturers who participate in the research project are tested by using the measurement form on critical thinking with the previous or old measurement form after the learning; the test also enquires the student samples on their opinions/attitudes toward the learning management that enhances critical thinking.

12. The researcher cooperates, sets appointments for dates and time for the meeting to summarise and evaluate the results of the learning management of the Thai language lecturers who participate in the research project.

13. The researcher opens the group meeting with the Thai language lecturers who participate in the research project on 18 November 2010 from 9 to 12 am at the Meeting Conference Room of Chiang Mai Campus Rajamangala University of Technology Lanna in order to summarise and evaluate their learning management, their attitudes, and their suggestions including their opinion toward the developed model.

### **Data Analysis**

In this step of the research, the researcher collects the derived data from the data collection activities to be analysed as the followings.

1. Quantitative data by using the basic statistics such as means and standard deviations.

1.1 The research compares the average scores of the samples' (lecturers) general knowledge of learning management that enhances critical thinking before (pre-test) and after their studying the self-directed learning manual (post-test) by using the Wilcoxon test. The percentage of development or improvement of these two kinds of score (Percent Change or PC according to Russell, 2000) is measured with the formula of  $PC = 100 (X2 - X1) / X1$ .

When PC is "Percentage" of development of the score

X1 is the score before the experiment (pre-test)

X2 is the score after the experiment (post-test)

1.2 The evaluation of the self-directed learning manual and the workshop meeting is done through their means and standard deviations through the identification of the interpretation of the meaning according to Likert's 5 rating scale (cited in Boonsong Nilkaew 1998: 146).

#### **Means**

4.50 - 5.00

3.50 – 4.49

2.50 – 3.49

1.50 – 2.49

1.00 - 1.49

#### **Definition**

Agree at the highest level

Agree at high level

Agree at moderately level

Agree at a little level

Agree at the least level

1.3 The evaluation of the quality of the preparation of learning management plan that enhances critical thinking by the lecturers who participate in the research project is made from the workshop meeting by the experts who are the ones who identify the criteria for the interpretation as the followings.

Score	Meaning
100-125 (higher than 80%)	Very good
88-99 (70 -79%)	Good
75-87 (60 – 69%)	Fair
25-74 (below 60%)	Need Improvement

1.4 The observation form on the learning management behaviour of the learning management in the classroom is set into five rating scale. The interpretation of the behaviour is observed in this five rating scale as the followings.

Means	Definition
4.50 - 5.00	Lecturers/students show behaviour at very good level
3.50 – 4.49	Lecturers/students show behaviour at good level
2.50 – 3.49	Lecturers/students show behaviour at fair level
1.50 – 2.49	Lecturers/students show behaviour at low level
1.00 - 1.49	Lecturers/students show behaviour at very low level

1.5 The comparison between the average score of critical thinking before (pre-test) and after the learning, the sample group of the students (post-test) is accomplished with the statistics Student's t-test.

1.6 The calculation of the means and standard deviations of the students' attitude toward the learning management is measured by identifying the interpretation using the criteria of five rating scale of Likert (Boonsong Nilkaew, 1998: 146).

Means	Meaning
4.50 - 5.00	Agree at the highest level
3.50 – 4.49	Agree at high level
2.50 – 3.49	Agree at moderately level
1.50 – 2.49	Agree at a little level
1.00 - 1.49	Agree at the least level

2. Qualitative data by the researcher gathers the data from observation, opinion, discussion, and suggestions of the lecturers and students. The data gathered will be analysed in form of contents, comparisons, criticisms, interpretation and evaluation of the events, and summary or conclusion.