CHAPTER 3

Research Methodology

The research aims to study and develop teaching provision competency of physical education teachers to promote health for primary students by the principle of research and development. The schemes of the research compose of three main steps and eight sub – steps.

Step 1 Study context and needs assessment to develop teaching provision competency to promote primary students' health

Step 1.1: Determine the items of competency in physical education teachers' teaching provision

Step 1.2: Develop and monitor the quality of tools used in studying the context and needs of development in physical education teachers' teaching provision

Step 1.3: Analyze the study result, context and needs assessment to develop teaching provision competency to promote primary students' health

Step 2 Construction and Quality Improvement for A Physical Education Teacher's Provision Competence Development Model to Promote Primary Student's Health

Step 2.1: Determine the structure of the model and procedures to develop physical education teachers' teaching provision competency

Step 2.2: Quality improvement of the model for teaching provision competency of physical education teachers

Step 3 Study on Effectiveness of A Physical Education Teacher's Provision Competence Development Model to Promote Primary Student's Health

Step 3.1: Experimentally use the model with physical education teachers in primary school

Step 3.2: Study on effect of the model

Step 3.3: Study on effectiveness of the model

The schemes of the above are;

Step 1 Study context and needs assessment to develop teaching provision competency to promote primary students' health

Step 1.1: Determine the items of competency in physical education teachers' teaching provision

1.1.1 Study and synthesize documents in the ideas, theories, principles and related research on instruction, general learning and teaching, physical education instruction, student center instruction, instruction planning, health – promoting physical education activities, evaluation, desirable physical education competency and teacher development methods

1.1.2 Determine the list of competency and identify variables in the research; physical education teaching provision means competency of physical education teachers there were 5 aspects as following: (1) an analysis on general condition, (2) implementing teaching and learning plan, (3) Teaching, (4) assessing and evaluating on learners and reflective thought in teaching, and (5) making an order on necessary aspects.

Step 1.2: Develop and quality improvement of tools used in studying the needs of development in physical education instruction competency

1.2.1 Create questions on the basis of the identified variables in the study to develop a questionnaire on the context and the needs of the development on physical education instruction competency for primary – students' health promotion. The questionnaire composes of three sections. Section one concerns the context, in which the questions are choice and fill in the blank, including 8 questions for general condition in the school, 9 questions about general condition of the students and 12 questions for general condition of the teachers. Section two concerns the needs of the development on physical education instruction competency; the remaining condition and the expected effectiveness in five dimensions. The 61 questions in this section are in Dural – response format. The questionnaire is 5 – level evaluation. In section 3 the questionnaire audiences rank the suitability and practicality of each development scheme by adding number 1 – 5 in front of the items. Moreover, there are open – ended questions for any suggestions.

1.2.2 Determine the topic for a focus – group meeting to frame the detail in the sample teachers' meeting. There are 3 topics; 1. Condition of physical education instruction in the current trend (45 mins), which comprises of perception of the teachers on the purpose of physical education, current class performance of the physical education teachers (teaching plan, methods, activities, media and evaluation), and problems and obstacles in physical education instruction, 2. Ideas and suggestions on the development of physical education instruction competency on 5 aspects as following: (1) an analysis on general condition, (2) implementing teaching and learning plan, (3) Teaching, (4) assessing and evaluating on learners and reflective thought in teaching, and (5) making an order on necessary aspects (45 minutes) and 3. Appropriate and potential schemes to develop those dimensions (30 minutes). The total time in the meeting is 120 minutes.

1.2.3 Examine the quality of the tools by proposing the drafts of the questionnaire and focus – group meeting topics to the thesis advisor before improving and revising. Then, the revised drafts are evaluated by 7 experts in Thai language, evaluation, educational research, physical education instruction, health promotion, sports science and psychology. The drafts' coherence between the questions and the variables, comprehensiveness and intelligible of the language used in each question, according to the seven experts, had Index of Item Objective Congruence (IOC) score 1.00 in each question.

1.2.4 Develop a complete version of the questionnaire on context and needs of the development on PE instruction competency to promote primary – school students' health for collecting data from the sample group.

Step 1.3: Analyze the study result, context and needs assessment to develop teaching provision competency to promote primary students' health

1.3.1 Determine the population; physical education teachers in 1,068 primary schools in the upper – north of Thailand belonging to the Office of the Basic Education Commission 8. The samples are characterized into two groups;

Group 1 containing PE teachers in primary school level, each is from a single of 321 schools in the Office of the Basic Education Commission 8 in the upper – north is arranged for the survey of context and significance in developing physical

education syllabus. The population is derived from three out of ten population in each level, sampling by Proportional Stratirfied Random Sampling method. (Sittipong, Sriphan 1999; Kietsuda Srisuk, 2009; Fraenkel & Wallen, 2006)

Group 2 contains 8 physical education teachers who are qualified with any of academic standing or gutachters in physical education or over – 5 year experienced in the field.

1.3.2 Collect data from group one by questionnaire survey, conducted between November, 2012 and March, 2014. By mail and in person, 284 out of 321 (88%) questionnaires were answered and returned to the researcher.

1.3.3 Examine completeness of the information in the questionnaires, then code the data for the analyzing process.

1.3.4 Collect data from group 2 by interview with all of the 8 teachers on the 28th of March, 2015 at the Holiday Garden Hotel, Mueng Chiang Mai, Thailand. The researcher was the interview and there were 5 assistants to note, record voice, pictures and motion picture as well as transcribe the interview. Then, the researcher reviewed the records before developing physical education syllabus for health promotion in primary – school students on the basis of the derived information.

1.3.5 Analyze the data from process one;

1) Data from the questionnaires on the context and the significance of developing physical education instruction is analyzed by percentage, mean, standard deviation, and summary the answers in the open questions.

2) The data of the significance index is ranged by Modified Priority Need Index with the formula suggested by Nongluck Wiratchai and Suwimon Wongwanitch (Wongwanitch, Suwimon, 2005) as followed;

$$(PNI_{Modified}) = \frac{(I - D)}{D}$$

$(PNI_{Modified})$ is the range of significance index

I is ($\overline{X}$) of the expected range

D is ($\overline{X}$) the existing range

3) The data of the significance of potential development is analyzed by frequency distribution method.

4) The data from the focus group interview is summarized

Step 2 Construction and quality improvement of A Physical Education Teachers' Teaching Provision Competency Development Model for Primary Student's Health Promotion

The research in this step aims to construction and quality improvement of a physical education teachers' teaching provision competency development model for primary student's health promotion and according to suggestions by experts, its schemes of operation are;

Step 2.1 Determine the structure of the model and methods to develop the teaching provision competency in order to acquire an appropriate model structure and method to the needs. Documents of related ideas, theories and principles as well as the information derived from step 1 are analyzed by the following schemes;

2.1.1 Collect the data of the ranked needs of development in physical education teaching provision in step 1 together with the studied related document and research on teacher and educational officer development

2.1.2 Analyze and categorize the data derived

2.1.3 Synthesize the data by creating a table to determine the structure of the developing model for PE teachers' teaching provision. The sample is shown in table 3.1

Table 3.1 The result of idea, theory and principle synthesizing and its conduct in the development model

Ideas, Theories and Principles	**The Applied Detail**	**The Detail Structure**
The idea of human resource development by Swanson (2001)	The principle of development by using the remaining resource safely and most beneficially. Experience and inspiration help encourage learning and developing.	Component 1 Development Direction 1. Development goals 2. Development principle 3. Nature of the giver and the receiver in the development model
Adult's learning theory by Knowles (2005)	Adults have individual needs and self – training ability. They use experience in learning.	
The principle of professional teacher development by Clarke (1994)	How to encourage the teacher's voluntary participation in development	
The principle of participation by Hord and others (1987)	How to create sense of participation and introduce innovations to teachers to use	
Professional teacher development by Sparks and Louks – Horley (1990)	Teachers will learn the most effectively when they need, or concern and want to solve problems, by using experience in learning.	

Table 3.1 (cont.)

Ideas, Theories and Principles	The Applied Detail	The Detail Structure
- The principle of friendly development by Amonvivat, Sumon (2004) - The principle of counseling by Ibarra (2008) - The study result of the needs assessment of the development	- The principle of understanding, cooperating, concentrating and uncovering - The counseling for the attendants in the development in person and in a small group to encourage the achievement in learning. The participants learn, analyze and reflect their ideas and conditions together in a creative atmosphere. - Range of the needs assessment of the development 1. General Condition Analysis 2. Implementing plan and teaching and learning 3. Teaching aspect 4. Learner Assessment Aspect 5. Reflecting on the instruction	**Component 2 Development Process** Step 1 Paradigm Shift & Study onto Lesson Plan include 2.1 Objective 2.2 Detail 2.3 Developing methods 2.4 Media and learning resource 2.5 Evaluation tools 2.6 Roles of the taker and the giver in the development Step 2 Approach the fieldwork & Mentoring Step 3 Sharing the lesson learned
Evaluation on effect of the human resource development project by Seyfarth (cite in Sermsak Wisalaporn et.al, 2002)	Effects of a professional development activity can be measured by 4 results 1) Reaction of the teachers via reflection and criticism after the project	**Component 3 Assessment of the Development** 3.1 Assessing along the development goals s 3.2 Assessing along the development objectives

Table 3.1 (cont.)

Ideas, Theories and Principles	The Applied Detail	The Detail Structure
	2) Knowledge of the teachers, measured before and after the project 3) Change of the teacher's habits after they apply knowledge and strategies form the development activities in the class 4) The students' increasing knowledge	

2.1.4 Determine the structure of the physical education teachers' teaching provision competency development model for primary student's health promotion, which composes of three principal components

2.1.5 After determining the structure, create document paper of the model and propose it to the thesis advisor to examine before improving and revising.

Step 2.2 Evaluate the developed physical education syllabus model

The aim of this step is to develop an accurate tool to evaluate the model of developing physical education syllabus. The process is as followed;

2 . 2.1 Study and analyze related documents in the Program Evaluation Standards, developed by the Joint Committee on Standards for Education Evaluation before determining the operational definition for the quality of the model, comprising of four aspects;

Feasibility means that the model is qualified to be applied relevantly to the existing condition, practical and easy to use.

Appropriateness means the model is suitable and relevant to the direction of development as well as its process and its evaluation.

Correctness and Sufficiency means the model is precise in developing process and relevant to the aim of the development. The detail is accurate and adequate for the development. The evaluation procedure is correct and benefits both teachers and students.

Usefulness means the outcome of the model is acceptable. It can be applied and advantages teachers, students as well as schools.

2.2.1 Create questions for the evaluation for the physical education syllabus – model for health promotion in primary school children. The questions are evaluative questions to determine 5 levels of quality, which examine all of the four aspects. There are 21 total questions, comprising of 4 questions for feasibility, 5 for appropriateness, 7 for correctness and sufficient and 5 for usefulness. Additionally, there are open questions to encourage suggestions for the quality of the model in each aspects and an overall idea.

2.2.3 Propose the evaluation of the developed physical education syllabus model for health promotion in primary-school students to the advisor to overview and adjust the model to any suggestions.

2.2.4 Require comments on the model's evaluation from five experts in evaluation, educational research and physical education. The questions had determined by their relevance to the variable of the quality, their clarity and the use of language. The result of the analysis, conducted by Index of Item Objective Congruence: IOC), is between 0 8 . 0 0 and 1 . 0 0 . The questions containing IOC > 0 . 8 0 are over the standard.

2.2.5 Adjust the questions to the comments by 8 experts.

2.2.6 After revising the model for developing effectiveness of physical education syllabus to promote health among primary school students and its evaluation, the draft of the complete evaluation was developed before proposing to 8 experts.

Collecting Data : The researcher collected the date in step 2 . 2 according to the following method;

1. Determine 8 experts who are expertise and experienced in Curriculum and Instruction, Physical Education, sport science, Educational Research and Evaluation and Teacher Education Personnel Development to evaluate quality of the development model.

2. Contact and coordinated with the experts to monitor the quality of the model.

3.Request for the letter from the Faculty of Education, Chiang Mai University in which was attached the draft of the development model of physical education teacher's competency on promoting primary student's health and the evaluation form. For the assessment the documents were sent to the experts by mail and in person. In the former method, the experts sent the evaluated form back to the researcher in the stamped envelope attached to the documents. In the latter, the researcher met the experts and had the evaluated form back in person. All of the evaluation forms were returned in the process performed in October, 2014.

4. Operate statistical analysis on the returned evaluation forms to find out the quality of the model in the four dimensions of assessment. Mean, standard deviation and suggestions were analyzed in this term.

5. Improve and revised the model according to the experts' suggestions and developed the complete model for physical education teachers' competency.

The outcome analysis in step 2

There are four dimensions to assess teaching competency of physical education teachers in promoting health among primary school students; 1) feasibility, 2) appropriation, 3) correctness and sufficiency and 4) usefulness. Mean and standard deviation were calculated and suggestions were summarized. Criterions for the mean are:

4.51 – 5.00 means the development model of physical education teachers' competency on promoting primary – school students' health is the most potential, proper, accurate, adequate and useful.

3.51 – 4.50 means the development model of physical education teachers' competency on promoting primary – school students' health is highly potential, proper, accurate, adequate and useful.

2.51 – 3.50 means the development model of physical education teachers' competency on promoting primary – school students' health is moderately potential, proper, accurate, adequate and useful.

1.51 – 2.50 means the development model of physical education teachers' competency on promoting primary – school students' health is slightly potential, proper, accurate, adequate and useful.

1.00 – 1.50 means the development model of physical education teachers' competency on promoting primary – school students' health is the least potential, proper, accurate, adequate and useful.

Step 3 Experimental use and effectiveness of the development model of physical education teacher teaching competency for primary student's health promotion.

The purpose in this step is to experimentally use and study effectiveness of the model. The tools in this stage are the assessment form on the evaluation on potential of physical education teachers' syllabus and 7 copies of general health questionnaires on the students. The procedures in this stage are:

Step 3.1 Experimental use the development model of physical education teachers' teaching competency.

The purpose in this stage is to experiment and develop the model. The means in this step are;

3.1.1 The sample group was identified. It comprised of 2 3 physical education teachers in primary school in Chiang Mai Primary Educational Service Area Office (PESAO), chosen by volunteering. According to the condition specified in the model, the teachers were physically competent and able to perform in practical section in physical education classes. The sample group for experiment 1 in Ban Donkhaew School, Baan Rimtai School, and Sanmahaphon School (area office 2). The sample group for experiment 2 in Sangwan Witthaya School, Baan Mae Hia Samakkhi School. Wat Chang Khian School, Wat Don Chan School, Wat Pa Ton School, Anuban Baan Tor Maung Lung, Cholprathan Pa Teak School, and Ban Moungton School (under office area 1)

The detail is presented in table 3.2;

Table 3.2 Population and Sample Classified by Affiliating Agency

Sample	School/ PESAO.	Number of the students		
		Total	Sample group	
			level	number
1	Baan Tha Kham School Chiang Mai (office area 5)	618	Year 4	30
2	Wangloong School Chiang Mai (office area 5)	200	Year 4	23
3	Ban Mae Tang Chiang Mai (office area 5)	98	Year 5	17
4	Ban Mae Tang Chiang Mai (office area 5)	-	Year 4	15
5	Ban Kong Hin School Chiang Mai (office area 5)	76	Year 4	9
6	Sri Chom Tong School Chiang Mai (office area 6)	1,326	Year 4	37
7	Sri Chom Tong School Chiang Mai (office area 6)	-	Year 2	39
8	Ban San Kam Phaeng Chiang Mai (office area 1)	1,501	Year 2	40
9	Ban Cheung Doi School (Doi Saket Sueksa) Chiang Mai (office area 1)	729	Year 4	30
10	Wat Kajao School Chiang Mai (office area 1)	238	Year 4	22
11	Wat Thaduea School Chiang Mai (office area 1)	203	Year 4	13
12	Ban On Klang School Chiang Mai (office area 1)	77	Year 4	14
	Total	**5,066**		**289**

3.1.2 The researcher, with a reference from the Faculty of Education, Chiang Mai University, requested for a permission to perform the experiment from the director of the Primary Educational Service Area Office and the head master of the school where the sample teachers belonged.

3.1.3 The researcher contacted to the schools' boards (to propose the scheme and the principle of the model and requested) for the permission to perform the experimentation in the schools.

3.1.4 The researcher, the school boards and the physical education teachers coordinated in scheduling the program of developing physical education syllabus to promote health amongst primary – school students. The schedule needed to be approved by the school boards and depended on the free time of the teachers in order not to affect the schools' curriculum.

3.1.5 The experimentation was held three times, as followed;

1) Experimentation 1

The experiment was held in March, 2013. The documents of the development model were proved on accuracy, clearness, language, development steps, difficult of the learning information, time, assessment tool and illustration in the class evaluation by three physical education teachers. The outcome of the experiment was summarized from the interview, as followed

1.1) The component, the steps in the model, was clear and suitable for the duty of PE teachers as the class instructor.

1.2) The information was proper. However, the briefed information was prepared, as it was concerned more harmonious to the nature of physical education teachers. The language was clear and effective when communicating.

1.3) In step 1, the experiment took 2 days in orienting the physical education teachers to the model. The samples were able to create the syllabus by themselves although some examples from the researcher were required. In turn, a short period was spent on the assessment tools to evaluate the paradigm, which was suitable to physical education teachers. However, in examining students' physical strength, how to use the testing tool had to be shown and there was lack of the tools in some school. Therefore, the project should provide the tools to those schools to borrow.

The overall time in the experiment depended on the number of the students. In step 2, the researcher went to field to consult the sample teachers in applying their syllabus in the class. More than 8 weeks is needed in order to observe the definite result. In consulting the teachers, there were many ways to contact to the sample group, in terms of the communication tools each person accessed to.

Additionally, before visiting the school, permission should be granted and the teachers had to be kept contacting. In step 3, the guided knowledge was shared and the lesson was concluded. The means and the time in this step were suitable. The place of meeting could be the school which is potential as a model school, the sample, for the teachers to study.

1.4) The assessment tools to evaluate the students were vary. However, the problems were that the students could not read, therefore the teacher needed to read the questions for the students to answer. Some questions were negative questions, which made it hard for students to understand. Hence the rank of the attitude should be deducted from five to three levels to make the difficulty suitable for primary school students. Moreover, the number, labeling the rank, should be changed to the words “high”, “middle”, and “low” or picture, because children tended to choose the box with the highest number without concerning reality. In addition, the pictures should be relevant to student’s life experience. Like some pictures, the students’ might have never known some types of sports and games, which should be called with the name the students were used to.

For the first experiment result, the above suggestions were applied to improve the model and its tool before developing the complete document for the second experiment.

2) The second experimentation

In the second experimentation, the improved model from the first experimentation is experimented with 8 physical education teachers in primary school. A two-day work shop was held on 4th-5th May at Mercure Hotel, Mueng, Chiang Mai. The purpose of the workshop was to inform and train the teachers in the detail comprising of general condition analysis, principals of physical education for health promotion, physical education teaching by the principal of Brain Based Learning : BBL, physical activities, physical education activities on the basis of BBL, creating

syllabus by BBL, health – promoting physical activities, evaluation in physical education, students' physical strength examination and principal of Backward Design for physical education syllabus. Before and after the experimentation, the physical education teacher's paradigm was evaluated, which was found that after the experiment the paradigm of 80% of the teachers had higher score. According to an unofficial interview, it is notable that long lecture is not preferable in the program, as the physical education teachers gave more participation in practical section than lecture.

Consequently, this result was adopted in the developed model by assigning demonstration, physical strength practice and a computer program to analyze the result of the students' physical-strength examination.

3) The third experimentation

In the third experimentation, the model which had improved through the three developments was applied among twelve sample teacher. The means of the experiment are as followed,

3.1) Before the experimental use of the model, competency of the physical education teachers on their syllabus and health condition of the students were examined by the tools which had been developed by the researcher.

3.2) The first step of the experiment was performed. A two-day workshop to orient and inform the teacher was held on 14th-15th January, 2014, at Chiang Mai Rajabhat University. The detail of the workshop included knowledge about the principle of physical education syllabus, example of physical activities based on BBL, demonstration of teaching on the basis of BBL, a workshop on creating a syllabus, demonstration and training on physical-strength examination and an application of a social media, Facebook (ID : PE PLC), to contact and consult the project. The teachers created the group slogan "PE for Education and Unity" and scheduled the continuing supervision and consult at school within 8 weeks. Additionally, before and after the experiment, provision of the teachers towards the physical education syllabus to promote primary-school students' health was examined, which found that the average score of the pre-test and the post-test were 15.88 and 19 respectively. Almost all of the teachers (91%) had higher score in the post-test. Furthermore, the teachers revealed their knowledge and competence in using physical-strength examination tool properly. According to an informal interview, the teachers

needed help about the tools to examine physical strength and the computer program to analyze the students' physical-strength examination result.

3.3) After the workshop, the model was experimentally used in the field work. The researcher consulted the twelve teachers, who had attended the workshop, for 8 weeks (between 16th January, 2014 and 15th March, 2014).

In the process, each teacher had at least one visit for supervision and consult at school. In the term, the researcher had an expert on teaching and educational supervision as a partner. The teachers were kept contacted and the researcher, as well as the partner, met the school director to declare the purpose of the project and ask for permission first. Then, documents of the syllabus developed by the teachers were examined before the class performance of the teachers as well as the students was investigated. Pictures and motion pictures were recorded during the class. After the class, the researcher and the expert returned the documents to the teachers, exchanged knowledge and evaluated the teaching by using the assessment developed by the researcher. The evaluation result, overall, was in good level with 4.08 average and 0.85 standard deviation. The consult during the program was provided to the teacher in different channels, such as personal meeting, telephone and social network (Facebook : PE PLC). The counsel was recorded into the form created by the researcher.

3.4) The model was experimentally used in step 3. After step 2, the same twelve samples attended a meeting at Ban Donkaew School, Mae Rim District, Chiang Mai, on 16th March, 2014, to exchange knowledge and visualize lesson learned. First, the researcher requested for the permission from the school director to use the school the location of the meeting, as the school is the model school for physical activities on the basis of brain-based learning to promote students' health. In this term, three experts were invited for the teachers to learn and exchange their experience with the specialists. Then, the attendants summarized the knowledge from the project under the title "The Result of A Physical Education Teacher's Competency Development Model for Primary Students' Health Promotion.", which comprised of 7 elements;1) paradigm in physical education syllabus, 2) self-development for physical education teaching competency to promote health amongst primary-school students, 3) media, activities and innovations derived from the developing procedures in physical education syllabus for health-promotion among primary-school students, 4) the result from the

physical education syllabus for primary-school students' health promotion, 5) problems and obstacles in developing the syllabus and solutions, 6) problems and obstacles in developing physical education teachers' competency in order to promote health in primary-school students and 7) impressions in attending the project. The researcher took the role of a chair person at the meeting and the results of the exchange are;

- The paradigm of the project's participants : According to the exchange, it can be concluded that the physical education teachers understand more needs of the children, have more complete purpose of the teaching, are able to choose relevant activities to the needs of the students and more effectively apply brain-based learning by allowing students to revise the activities, which have been done, solve problems, repeat the activities and recreate new things, which helps promote desirable habits and long term health condition among students. Formerly, the physical education class emphasized on students' strength on sports skill and competition in sports games, but the new principal focuses on how to promote students' physical strength, which is related to the education syllabus in the 21th century. The new method provides activities and games to primary-school children to develop their mixed movement skill, which leads to sport-skills. Moreover, the new procedure will be continued in the following semesters and extended to other subjects in the same department.

- It can be concluded from the knowledge exchange that self-improvement procedure for teaching – physical education competency to promote health in primary-school students is beneficial for the development. In the first step, the orientation program for the teacher to introduce paradigm and knowledge in the model should be held before the school opens. The program takes one day and includes analysis of the curriculum, standard and indicator to determine the important skills, details and activities to each school level, which will be taken as a model for the whole semester. Moreover, during the period of developing the syllabus, the teacher should exchange information and present their work. In the second step, consulting the teachers in the field, the teachers' class performance should be monitored. The context of the work and the school with perfect class practice should also be studied. For the consult, it can be performed through different communicative ways, especially Facebook (PE PLC group), by which the teachers share their medias and innovations in the project which inspire one another to develop their own in the school. Additionally, this social media is

a channel for teacher to exchange information, share the summary of the lesson and help create a physical education teacher network. However, there is a restriction about time. This process should be held during a school break, as the teachers have plenty of tasks to do when the school is opening. Moreover, the teachers should present their work to share the solid idea to the others.

- The innovations in physical education syllabus for primary-school students health promotion: During the project, a physical education teacher from Maetaeng School created activities and a BBL playground on the basis of the belief that "Body movement promotes children's learning competency and shortens time for students to absorb knowledge,". Children could play in the BBL playground 5-7 minutes before the morning class and in the free time. This helps students to be active and sensible. In academic learning, students could read and write efficiently, which promote their study results (better grade). In 2013, the school sent the innovation to a project competition by the Office of the Basic Education Commission of Thailand and the student won a gold medal in the country stage. Another sample was one of the teachers in the projects who create teaching innovation for physical education which competed in a competition in the stage of primary education service area and, also, won a gold medal. These examples can be a model and sauce of knowledge for other teachers.

- The result of the physical education instruction for primary school students' health promotion: According to the exchange, it is found that, academically, students had better study result. The students were delighted with learning physical education, had healthy behaviors and liked physical exercise and sports, which was determined by frequency of sports equipment borrowed by student. The students showed positive attitudes towards physical education by revealing their enthusiastic to learn-asking about activities the teacher planned to teach before the class began. Moreover, students' physical strength was in good level. In social relationship, the students were more well-behaved.

- Problems, obstacles and solution in developing physical education teaching competency for students' health promotion: It is found that there was lack of equipment, some of which were too expensive. Therefore, the remaining materials and reused objects, such as old vehicle tires, broom sticks, baskets, cardboard

boxes, rope and rubber bands, were applied. Moreover, there was a restriction about the location of the class, which is outdoor. Some students did not want to learn because they could not stand very hot weather. In rainy season, the field was wet with mud, so the lessons and activities should be adjusted to these conditions. Furthermore, in the second semester, there are plenty of workloads for the teachers as there are activities throughout the term. In the case, the school board and teacher colleagues need to understand importance of physical education and support the class to achieve its target.

- Problems, obstacles and solution in developing physical education teaching competency for students' health promotion: It is found that disregard in importance of physical education and prohibition on students' play and exercise are obstacle to the development. Hence, the school boards, the school's academic section and teacher colleagues should support the project by understanding and regarding importance of brain-based learning as well as benefit of the development. There should also be result extension by applying brain-based learning method in the other departments and in other school. If there is a model school to reveal solid outcome of the project, other schools will be confident and adopt the program. Additionally, the time to arrange the class, according to the procedure, was inadequate, as physical education class took only one hour per week, which is deficient. Therefore, the profit outcome derived from the project should be submitted to the school board to comprehend administer the importance of physical education and propose more class duration. Furthermore, the model of physical education for health promotion and brain-based learning should be developed in universities, for the teachers of the physical education teachers. The syllabus should be recreated and taught to university students, which will highly benefit the development of Chiang Mai Rajabhat University's teaching curriculum, which will be a potential model of teaching in the future.

- Impression in the project: According to the exchange meeting, the physical education teachers accepted that the knowledge in the project was new for them. The teachers thought that they were lucky to have an opportunity to attend the project. Normally, physical education teachers rarely have a chance to attend programs for competency enhancement, then they were appreciated when knowing importance of physical education was recognized. Hence, the teachers had strong intention to apply the knowledge gained in the project in their work. Moreover, the teachers met fellows in

their occupation, and had idea form other schools and suggestions as well as support in teaching from the researcher, a university instructor, which did not occur very frequently. In addition, the teachers changed nature of the physical education class from emphasizing on sports and competition to aiming on creating students' habit of movement, exercise and sport playing in order to promote their health, as one of the teachers said

> *"...I feel warm as an expert gives me knowledge. She also monitors me like a mirror, to reflect me and make me know that I need to improve. I used to think that I was the one who was excellent and flawless but now I've opened up as I attend this program..."*
>
> *"...I'm impressed on how the instructor is so friendly. We can talk and I have a chance to get the knowledge about how to teach and the target of teaching, which makes me happy to teach..."*

According to the data analysis, when asked about attitudes towards the lesson – learned activity with the tools developed by the researcher at the exchange meeting, the teachers showed their attitudes towards the activities in high rank (4.50 average and 0.55 standard deviation). However, not all of the twelve teachers attended the activity in the same day due to difficulties about transportation and the other meeting they needed to attend in the same day. Then, the proper date and setting of the workshop should be chosen. For example, it might be held during a school break with an invitation or an appointment. The syllabus should be held in the class for the whole semester and it should be a long – run project at school because the teachers feel confident when they are assisted. The result of data analysis on the physical education teachers' attitude towards lesson – learned exchange meeting is shown in table 3.9.

Table 3.3: Mean and Standard Deviation of the Scores on Opinion of Physical Education Teachers on Learning Exchanging and Lesson Extracting Activities

Items	Average	Standard Deviation	Analysis
1. The range of achievement in activities			
1.1 presentation	4.08	0.67	high
1.2 experience exchange	4.67	0.49	highest
1.3 knowledge gained	4.50	0.52	high
2. The knowledge application	4.75	0.45	highest
3. The knowledge expansion	4.42	0.51	high
4. the appropriation of the instructor	5.00	0.00	highest
5. The activities	4.33	0.49	high
6. The facility	4.50	0.52	high
7. The amount of time in the activity	4.25	0.62	high
8. The venue	4.33	0.49	high
9. Overall satisfaction towards the activity	4.67	0.49	highest
Total	**4.50**	**0.55**	**high**

Step 3.2 Studying effect of development model of physical education teachers' competency

The research in the step aims to study effectiveness of the model on the twelve sample physical education teachers' competency in the project and the result on the 289 students. The procedures were as followed ;

3 . 2 . 1 Determined the variable of the physical education teachers' competency in 5 angles and the students' health condition in 4 angles

A Physical Education Teachers' Teaching Provision Competency Development Model for Primary Students' Health Promotion means the physical education teachers' ability in the managing the syllabus which included ; 1) general conditions analysis aspect, 2) Instructional provision planning aspect, 3) Instruction implementation aspect 4) Learner assessment aspect and 5) Reflecting on the instruction

The students' health means habits or conditions which reveal the students' health. Health condition comprises of four dimensions;

- **Physical health condition** means the students' moving habits, exercise and sports playing, which comprise of three sub-habits ; 1) activities in routine which require so much energy that cause sweat and higher heart rate, 2) movements or exercises which require continuing movement in gross motor and 3) avoidance of being idle. The condition was determined by questionnaires on habits of moving, exercising and playing sports. The questionnaire, which was 8 level evaluation composing of 10 questions, was used to ask students the questions before and after the project.

- **Mental health condition** means feeling or attitudes of students on movements, exercise and sports playing, which were determined by questionnaire, which was 3 level evaluation composed of 10 questions. The students were asked with the questionnaire before and after the application of the project.

- **Social health condition** means feeling or attitudes of the students on their peers, family members and surrounding people. The condition was determined by questionnaires on relationship amongst friends, family members and surrounding people. The questionnaire was 3 -level evaluation comprising of 15 questions, which was conducted before and after the project.

- **Intelligence health condition** means abilities of critical thinking, problems synthesizing, problem solving and creativities thinking in the student. It was determined by the examination form in which the attendants considered statements or pictures, then answered the questions by marking and writing the answers. The students had the test before and after using the model.

3.2.2 Creating the tools to collect data based on identification of the variables. There are 6 tools as followed;

Tool 1 Evaluation form on competency on physical education syllabus for primary-school students' health. The form is used to evaluate the sample teachers. It comprises of two sections. First is general information of the teachers and second was the evaluation on physical education teaching competency for students' health in five angles, which was 3-level evaluation with 35 questions.

Tool 2 Questionnaire on primary-school students' habits of movement, exercise and sports playing. The questionnaire, 8-level evaluation with 10 questions, was used each time of activity in 1 week.

Tool 3 Questionnaire on primary-school students' movement, exercise and sports playing. The questionnaire, a 3-level evaluation with 15 questions, was used to collect data of attitudes towards movement, exercise and sports playing.

Tool 4 Questionnaire on relationship between primary-school students and their family members as well as their surrounding people. The questionnaire, a 3-level evaluation with 15 questions, was used to collect data of attitudes towards friends, family members and surrounding people.

Tool 5 Evaluation form on students' skill of critical thinking, problems synthesizing, problem solution and creativity in primary school 1-3. The solution was 4 objective questions. Question one aimed to evaluate critical thinking by categorizing physical activities, composing of 12 items (total score: 12). Question two aimed to evaluate problems synthesizing by ranging 5 pictures of desirable activities (total score : 5) Question 3 aimed to evaluate problem solution. The students marked ☐ in the box ☐ in front of desirable activities and × in the box ☐ in front of undesirable activities. There were 8 pictures for total score 8. Question 4 aimed to evaluate creativity. Students marked ✓ in the box ☐ in front of 10 pictures of healthy activities (total score: 10). The four questions were marked total score 35.

Tool 6 Evaluation form on the students' skills of critical thinking, problems synthesizing, problem solution and creativity in primary school 4-6. The evaluation was 4 objective questions. Question one aimed to evaluate critical thinking by categorized 20 given words into physical activities (total score: 20). Question two aimed to evaluate problem synthesizing by using the given words to create a plan to promote the student's own health in one week (total score: 3). Question three aimed to evaluate problem solution skill. Students described how to heal the injuries given (total score: 3). Question 4 was to evaluate creativity by describing other physical activities from ones identified in the test to promote their health (total score: 3). The four questions were marked total score 29.

3.2.3 Examine the quality of the tools. The procedures are;

Tool 1 The evaluation form for a physical education teachers' teaching competency for primary students' health promotion was developed and evaluated by.

1) Studying, analyzing and synthesizing documents, relevant research in analyzing students and general condition, instruction principle, student-centered instruction, BBL physical education instruction, teaching physical education, instruction planning and evaluating.

2) Developing a draft of evaluation form on the basis of the determined variables. The thesis advisor examined and commented on the draft before improving and revising.

3) Determining the relevance between the questions and the variables in physical education teachers' competency in the evaluation form by five experts in evaluation, educational research and physical education. The evaluation was also examined its language usage and clearness of the questions with the Index of Item Objective Congruence (IOC) score 1.00 in each question.

4) Operational field testing the evaluation form with 40 physical education teachers in Saraburi Province to find reliability rate by Conbach's Alpha coefficient method. The outcome of the whole form is 0.97, which shows high reliability of the tool

5) Developing the complete evaluation form of physical education teaching competency to promote primary-school students' health to collect data amongst the sample physical education teachers

Tool 2 -6 The tools to collect data of effectiveness on the students. The procedures of developing and evaluating the tools are as followed;

1) Study, analyze and synthesize relevant documents on physical education instruction for health promotion, brain method in learning physical education, key to success in physical education learning, types of physical activities and physical education, physical activities to promote health, educational and learning psychology, learning and teaching principles, BBL principles, intellection, principles of evaluation, principles of physical education evaluation, social measuring tools, tools for measuring socialization and creating educational evaluation tools.

2) Adjusting every draft of the tools to the variables in the research. The drafts were submitted to the thesis advisor before improving and revising.

3) Examining the relevance between the questions in every tool and the variables in the research by five experts. Additionally, the language usage and the clearness of the questions, the answers and the scoring procedure and had Index of Item Objective Congruence (IOC) score 1.00 in each tool and question.

4) Operational field testing the tools with 36 primary students in San Mahaphon Wittaya School, Chiang Mai. Then, reliabilities of the questionnaire on habits of movements, exercise and sports playing in primary students (tool 2), the questionnaire on attitudes towards movements, exercises and sports playing of primary students (tool 3) and the questionnaire on relationship between primary students and their friends, family members and surrounding people (tool 4) were analyzed by Conbach's Alpha coefficient method and had score 0.82, 0.72 and 0.75 respectively.

5) Tool 5: Evaluation form for critical thinking, synthesizing and problem solving in primary students year 1-3. It was examined with 18 primary student year 1-3 in the same school. Difficulty of the four questions was calculated with a simple formula (proportion between the scores the students had and the total score) and the outcome were 0.72, 0.79, 0.71 and 0.70 respectively, which indicated that the evaluation was easy and slightly easy. Moreover, reliability of the whole, calculated with Conbach's Alpha coefficient method, was 0.86.

6) Tool 6: Evaluation form for critical thinking, synthesizing and problem solving in primary-school students year 4-6. It was applied with 18 primary student year 4-6 in the same school. Difficulty of the four questions was calculated with a simple formula (proportion between the score the students could do and the total score) and the outcome were 0.81, 0.70, and 0.76 respectively, which suggested that the evaluation was hard and quit easy. Moreover, reliability of the whole, calculated with Conbach's Alpha coefficient method, was at 0.79.

7) Improving and revising in the dimension of clearness of the directions, questions, range of choices and scoring and developing the complete version for collecting data amongst the students.

3.2.4 Collect data of the physical education teachers' teaching competency and the students' health

1) Study effectiveness of the model on a physical education teachers' teaching competency for primary students' health promotion. The evaluators are 1) the school boards, 2) the experts, the vice director of the Primary Education Service Area Office or educationists and 3) the physical education teachers (evaluate themselves). The tool is the evaluation form on competency on physical education syllabus for primary students' health (tool 1), and the time of operation was before and after applying the model (in January, 2014 and March, 2014).

2) Study effectiveness of the model on the students' health in 4 angles, which are physical health, mental health, social health and intelligence health. The data was collected in the sample students by tool 2-6. The period of the operation was before applying the model in January, 2014 and after the model in March, 2014.

3.3.5 Analyze the data of effectiveness on the model by the following statistics;

1) The physical education teachers' teaching competency is determined by arrange and standard derivation. The outcomes of the evaluation on the competency, overall, were good, according to the following range;

4.50 – 5.00 means the teachers are the most competent in the certain objective.

3.50 – 4.49 means the teachers are very competent in the certain objective.

2.50 – 3.49 means the teachers are moderately competent in the certain objective.

1.50 – 2.49 means the teachers are slightly competent in the certain objective.

1.00 – 1.49 means the teachers are the least competent in the certain objective.

2) Health evaluation among the students who attended the physical education class for health promotion in four dimensions ; physical health, mental health, social health and intelligence health. The data in each dimension is analyzed by;

2.1) Physical Health Condition: Percentage was applied to measure habits of movements, exercise and sports playing. Overall, the outcome were good, according to the following scale,

Never means the habit need improvement

1-2 days per week means the habit is little

3-5 days per week means the habit is moderate

over 5 days per week means the habit is much

2.2) Mental health Condition: Frequency and percentage was applied to measure attitudes on movements, exercises and sports playing. Overall, the outcome were high, according to the scale,

2.50 – 3.00 means the attitudes is much

1.50 – 2.49 means the attitudes is moderate

1.00 – 1.49 means the attitudes is little

2 . 3) Social health Condition: Frequency and percentage were applied to measure relationship with friends, family members and surrounding people. Overall, the outcomes were high, according to the scale;

2.50 – 3.00 means the relationship is much

1.50 – 2.49 means the relationship is moderate

1.00 – 1.49 means the relationship needs little

2.4) Intellectual Health Condition: It was measured by examinations on skills of critical thinking, synthesizing, problem solving and creativity. The tools were two examination forms, each of which contained 4 questions. The students had the test before and after attending the project model. Frequency and percentage were applied to analyze the derived data. According to the measuring on the ability of critical thinking, synthesizing, problem solving and creative thinking, 80% of the students passed with good level. The scale for measuring is;

Over 80% indicates excellent thinking ability.

70 – 79% indicates good thinking ability.

50 – 69% indicates fair thinking ability.

Below 50% indicates not passing the criterion

Step 3 .3 study efficiencies of development model of physical education teachers' competency. The research in this stage aims to study efficiencies of development model according to the attitudes of the sample physical education teachers, who attended the project model, which was operated by the following scheme;

3.3.1 Develop and found quality of evaluation tools for the model

1) Determine variables in effectiveness in the model, which include practicality, appropriate ability, accuracy and sufficiency as well as usefulness and satisfaction on the developing model.

2) Create questions on the basis of the variables in effectiveness and develop evaluation forms on the effectiveness of the developing model of physical education teachers' competency on promoting primary-school students' health (teacher version). The evaluation is a five-level evaluation, comprising of two sections. Section 1 is the evaluation on 5 items of dimensions, including 3 1 questions. Section 2 composes of open-ended questions about problems and obstacles in the development.

3) Propose the draft of the evaluation on the developing model to 5 experts in measuring and evaluation, educational research and physical education to determine consistencies between the questions and the variables, language usage and clearness of the questions. The result from the data analysis is 1.00 index of item objective congruence (IOC) in every question.

3 .3 .2 Study effectiveness of the model by collecting data from the 1 2 sample physical education teachers after operating the model.

3 .3 .3 Analyze the data derived from evaluation on the developing model by the method of average, standard derivation and summarization.