CHAPTER 1

Introduction

1.1 Background and Significance of the Study

Mathematics learning management in the 21st century requires supporting learners in gaining necessary skills such as problem-solving skills, patterning skills, creative thinking and reasoning skills, and communication skills. Thus, for teaching mathematics in the21st century, a teacher needs to give priority to this concept. In classes, a teacher is a facilitator of learning who emphasizes the class's cooperation and supports learners to solve math problems creatively and in various ways, including communicating about and presenting the concept of solving math problems and explaining their ideas, because a variety of problem-solving skills is necessary for educational and national development while preparing for the 21st century (Maitree Inprasitha, 2 0 1 4). In previous learning management styles, a math teacher simply followed a textbook and stuck with the traditional teaching style (Vicharn Panich, 2012andMaitree Inprasitha, 2014). In other words, the traditional teacher began a lesson by telling students how to solve math problems directly, and this why students could barely find the solutions by themselves. Also, the teachers gave more importance to the answer than to the procedure, so students neglected the problem-solving process and, instead, focused on the shortest and easiest way to get the right answer. Therefore, students have lacked critical thinking skills, and they have been unable to synthesize information in order to understand the process of finding a solution, which has caused low test results, both nationally and internationally. Obviously, the average result of the O-Net is below the standard as the average test result is failing in every subject (Somwang Suriyaruangkit, n.d.).

Therefore, public and private organizations have hastily tried to improve teachers and provide them workshops continuously. According to the report of the status of Thai teachers' production and improvement in 2015, the development of teacher training that has been offered has not met teachers' needs because the development?, is mostly managed by

the original affiliation's determination, both in the content of curriculum and training courses, which do not agree with the teachers' requirements, and the training courses have not been clearly planned (Office of the Education Council, Ministry of Education, 2015). Most of the workshops that have been provided which focuses on content and activities have usually been offered during office hours. Since teachers always join the workshops, the students have been left behind in class. Although teachers have been developing through these training courses (Witayakorn Chiengku, 2007), the procedure of supervision of practical teaching auditing has been insufficient. In other words, teachers' improvement and success as a path of national education reform cannot be accomplished in the short term, but, instead, it needs to be a long-term plan which includes continuous feedback (Sirinapa Kijkuakul, 2010: 45-59). Besides, teacher development can allow the teachers on duty to conform to the research results of the Office of the Education Council (2013). Teachers' production has always brought about a lot of problems, especially with respect to the discontinuous policies caused by changes made by politicians and the lack of information and cooperation between manufacturers and teachers. From this, it would seem that the consequences of these problems would be a smaller budget for teacher development, but the result was that students still failed their exams (Phasina Tangjuang, 2009).

Although many institutes have continuously determined the policy of teacher development, the study about the condition of the teachers' production and development in 2558 exposed that teacher training was not in accord with the teachers' needs. For most of the trainings offered, the original affiliations were responsible for determining the content, curriculum, and training programs, which focus more on a process of monitoring, but the process cannot be used in a practical teaching due to the lack of information and cooperation between the producers and the users (Office of the Education Council, Ministry of Education, 2015). The teachers' development needs a long-term plan and a continuous audit (Sirinapa Kijkuakul, 2010: 45-59). A teacher's production, development, and role needs to adjust and improve the teacher for students' standards. In coordination between the teachers and the process of production, the connection and the development method should have the same direction and fulfill in a practical way, both in the production, development, and role of the teachers. Therefore, it is necessary that the process of student improvement includes good thinking and problem-solving skills and a system and process of teacher development that can also enhance teacher training.

At the heart of teacher production is a teaching training program and having a mentor teacher as an important person for the training teacher since a mentor can help the training teacher and coordinate between the users and the producers well. According to the study of Fives et al. (2007:916-932), the result showed that the mentor teacher who gave suggestions to training teacher caused the training teachers to teach more efficient than the mentor teacher who only observed the classes. Similarly, Frayne, H.R.(2007:53-66) stated that supervision from a mentor teacher is important because a mentor teacher who was trained about supervision influences the development of training teacher more than a mentor teacher who has never passed any training courses. Grannot (1993 cited in Fives et al., 2007:920) stated that the human interaction depends on the level of cooperation from both teachers. They also added that if the interaction between a mentor teacher and a training teacher is at a low level, the teaching efficiency of a training teacher will be at a low level as well. In contrast, if a mentor teacher has a good interaction with a training teacher, helping in various ways, the training teachers will be more efficient in teaching.

Mentoring is important for teacher development and teacher production to process efficiently. According to the survey of the professional experience center of northern Rajabhat University, mentor teacher development has previously focused on the roles of mentor teachers giving advice, supervising teacher trainees by having a meeting, and instructing and providing workshops for every subject. For the development of the mentor teachers, the model has not obviously been constructed; therefore, the mentor teachers still need to improve themselves from a “high” level to “the highest” (Komkai P, 2012). By looking at the content and the need for developing mentor teachers’ competency, it can be revealed that mentor teachers have the knowledge relating the principle and the method in learning provisions for improving 21st century learners from a “moderate” level to a “high” level. In the attitude aspect, teachers have the ability in mathematics learning provisions for improving21st century learners at a “moderate” level.

Previously, a model of developing mentor teachers’ competency was mostly provided as a coaching supervision, auditing for mentor teachers, and teaching model development for teacher trainees. The researchers studied various models and found the model of supervising in order to enhance teaching competency and classroom researches entitled “PPME” (Kanitha Chaowatthanakun, 2010) which is comprised of the elements of

principles and objectives, elements of processes, and the elements of supportive processes. The model of learning which focuses on learning management that promotes teaching competency of teaching trainees (Bandhit Chatwiroj, 2007) is comprised of theories, basic concepts, principles, purposes, teaching processes, model applications, and results in application. The principle of knowledge management contains four steps: Problem, Plan, Co-Create and Apply (PPCA). The model of auditing and supporting the mentor teachers is to apply the frame of local curriculum to the classes of teacher trainees (Karanphon Wiwanthamongkon, 2010). The model named CPPME includes principles of auditing from mentor teachers, from whom teacher trainees need suggestions, support, idea-sharing, and examples, promoting the teacher trainees in learning provisions accordant with the local curriculum frames. This can show the development of former models mostly. Nowadays, mentor teacher development, especially mathematics focusing on enhancing mathematics learning provisions and supervision in the 21st century, has not been clear enough. Therefore, the department needs to develop a suitable model, particularly in competency development for the cooperation between mentor teachers and teacher trainees for Professional Learning Communities (PLC) in mathematics learning provision for the 21st century which highlight the thinkers solving problems by themselves by having a teacher as a facilitator for 21st century learners.

In order to improve a model of developing mentor teachers to be appropriate and to support the mathematics learning provisions for the 21st century, the researcher as a teacher in the mathematics department together with the supervisor for the mathematics teacher trainees should give importance to the mathematics mentor teachers encouraging the mentor teachers and teacher trainees to have the characteristic of the 21st century teacher. In this teacher competency development for mathematics learning provisions for the 21st century, the learning procedures should be created with the 21st century learning based on Thainess: the teacher's characteristic in the 21st century should be as a scholar or an expert who has various activities with high potential. Besides, the teachers need to be innovators to allow students to reach the objectives expected, and to prepare them to be global workers in the 21st century (OECD, 2012). Also, the teachers need to have knowledge, abilities, and skills in learning management as facilitators according to the changes in the 21st century.

In this study, the researcher would develop a model of developing mentor teacher's competency to enhance mathematics learning provisions for the 21st century by considering

the theory of adult learning, the theory of motivation, the concept of a professional learning community. The researcher had a basic concept and belief of teacher development which aligns with the mathematics learning provisions for the 21st century, which need a principle of adult learning because adults can learn best in situations without enforcement because they understand the importance of what they are going to learn. Thus, the research employed Maslow's theory and studied the mentor teachers' needs so as to be a method of model developing mentor teachers' competency by drawing from the basic human need to be accepted using the motivation, creating the mentor teachers' belief and faith in human creation, and inspiring mentor teachers to see the importance of being a mentor and a role model for teacher trainees. Hence, the mentor teachers would cooperate in developing the competency of this research. In this study, the researcher as a professor at Lampang Rajabhat University and the supervisor for mathematics teacher trainees gives significance to the mentor teachers' development to prepare themselves for the 21st century provisions. The mentor teachers and teacher trainees should cooperate in creating a professional learning community and using the teaching methods that emphasize math problem-solving skills done by the students themselves. The development also focuses on both production processes and regular teachers to improve the teacher trainees together with the mentor teachers. If the problems mentioned cannot be developed, the mentor teachers still have methods to evaluate the teacher trainees. However, the teacher trainees would lack appropriate and accurate suggestions and support from the mentor teachers. The teaching method has still been the same as usual, and this cannot fulfill the purpose of the curriculum, which aims to produce graduates continuously to be teachers who employ the thinking processes for students and provide learning management for the changes in the 21st century.

The model of developing mentor teachers' competency in this study is a development of mentor teachers to enhance their mathematics learning provision and the supervision in the 21st century by emphasizing the cooperation between mentor teachers and teacher trainees in mathematics as a professional learning community. In the math classes, learners need to be trained through various methods as critical thinkers and problem solvers in order to develop both the mentor teachers and teacher trainees preparing themselves to be teachers in 21stcentury learners.

1.2 Research Questions

1) What is the current condition of the mathematics learning provisions, the mentor teachers' supervision, and the need to develop their competency in enhancing mathematics learning provision in the 21st century?

2) How should a model of developing mentor teachers' competency to enhance mathematics learning provision in the21stcentury be?

3) How are the results of a model used to develop mentor teachers' competency to enhance mathematics learning provision in the 21stcentury?

1.3 Research Objectives

1) To study a current condition of a mathematics learning provision, the mentor teachers' supervision, and the needs to develop their competency in enhancing mathematics learning provisions in the 21st century

2) To develop a model of developing mentor teachers' competency to enhance mathematics learning provisions in the 21st century

3) To examine a result of a model used in developing mentor teachers' competency to enhance mathematics learning provisions in the 21st century

1.4 Research Scope

1) Population Scope was divided into 4 periods as follows.

1.1) A period study of a current condition of a mathematics learning provision, the mentor teachers' supervision, and the needs to develop their competency in enhancing mathematics learning provisions in the 21st century

Population consisted of mentor teachers for mathematics training at Rajabhat Universities in the Higher North Regions

1.2) A period study of development of a model for developing mentor teachers' competency to enhance mathematics learning provisions in the 21st century

Population consisted of experts in human resource development, mathematics, measurement and evaluation of education, teacher training, mentor teachers for mathematics training teachers and supervisors at Rajabhat Universities in the Higher North Regions

1.3) A period study of trial of a model for developing mentor teachers' competency to enhance mathematics learning provisions in the 21st century

Population consisted of mentor teachers for mathematics training teachers at Lampang Rajabhat University

1.4) A period study of results of a model used for developing mentor teachers' competency to enhance mathematics learning provisions in the 21st century

Population consisted of mentor teachers for mathematics training teachers Lampang Rajabhat University

2) Content scope

The content used in the models for developing mentor teachers' competency to enhance mathematics learning provisions in the 21st century consists of:

2.1) The current condition of the mathematics learning provisions, and the mentor teachers' supervision

2.2) The need for developing the mentor teachers' competency in enhancing mathematics learning provisions in the 21st century

2.3) Principles, concepts, and theories of the model for developing mentor teachers' competency to enhance mathematics learning provisions in the 21st century, including the concept of human resource development, theory of adult learning, theory of social learning, mathematics learning provisions in the 21st century, and the community construction of profession learning.

2.4) A trial of a model for developing mentor teachers' competency to enhance mathematics learning provisions in the 21st century

2.5) A result of a model used to develop mentor teachers' competency to enhance mathematics learning provisions in the 21st century

(1) Results of the model's efficiency can be separated into 4 aspects:

(1.1) Standard of Feasibility

(1.2) Standard of Appropriateness

(1.3) Standard of Adequacy

(1.4) Standard of Utility

(2) Results of a model used to develop mentor teachers' competency to enhance mathematics learning provisions in the 21st century were:

(2.1) Competency of contents, skills, and characteristics of mentor teachers to enhance mathematics learning provisions in the 21st century

(2.2) Attitude towards a mentor teacher's supervision from the training teachers after employing the model of developing mentor teachers' competency to enhance mathematics learning provisions in the 21st century

2.6) Suggestions about the model for developing mentor teachers' competency to enhance mathematics learning provisions in the 21st century including suggestions about model development and the trial, and a study of the results of model use from experts, mentor teachers, and training teachers

1.5 Definitions

1) Model is defined as the structure showing the involvement and the relationship of the steps of operation as well as the results of the operation based on principles, concepts, and theories.

2) The model of developing mentor teachers' competency to enhance mathematics learning provisions in the 21st century is defined as the structure showing the involvement and the relationship of developing mentor teachers' competency to enhance mathematics learning provisions in the 2 1 st century. The research is conducted from a framework of study by having theories as basis, focusing on the cooperation of mentor teachers and mathematics training teachers in a professional learning community (PLC).

3) Mathematics learning provisions in the 2 1st century is defined as learning management style in which teachers provide learning activities and act as facilitators in learning, encouraging learners to have cooperation skills, creative thinking skills, math problem-solving skills, and communication skills for presenting ideas about solutions.

4) Results of the model for developing mentor teachers' competency to enhance mathematics learning provisions in the 21st century is defined as the mentor teachers' competency after employing the model for developing mentor teachers' competency to enhance mathematics learning provisions in the 21st century as well as the satisfaction of training teachers towards the mentor teachers' supervision in employing the model of developing mentor teachers' competency to enhance mathematics learning provisions in the 21st century.

4.1) Mentor teachers' competency is defined as the mentor teachers' ability in mathematics learning provisions and their ability in supervision to enhance mathematics learning provisions in the 21st century which are classified as competency of knowledge, competency of practice, and competency of attitude.

4.1.1) Competency of Knowledge is defined as the knowledge of a mentor teacher when relating mathematics learning provisions in the 21st century, supervision to enhance mathematics learning provisions in the 21st century, and the teacher's development through conducting a professional learning community.

4.1.2) Competency of Practice is defined as the ability of mentor teachers in cooperation with the training teachers in preparing lesson plans, learning management, and evaluation, as well as the ability to peer coach and cooperate while conducting the professional learning community.

4.1.3) Competency of attitude is defined as the ability of mentor teachers to have the appropriate attitude towards teaching mathematics and supervising as well as their determination for teaching and supervising in order to promote learners' aptitude, attitude, and faith towards the value of mathematics in order to form a relationship with students, show their determination, be proud of their professional development, and be happy supervising as a mentor teacher.

4.2) Satisfaction of teaching teachers towards mentor teachers' supervision is defined as the feelings of training teachers towards mentor teachers with regard to assisting, caring for, guiding, auditing, and evaluating mathematics learning provisions in the 21st century according to the coaching report and authentic assessment completed by training teachers.

5) Efficiency of model is defined as the quality of a model for developing mentor teachers' competency in order to enhance mathematics learning provision in the 21st century accordant with the 4 standards, which passed the audit and the adjustment of the model following the research model and education development. Assessment is standardized through the following aspects:

5.1) Feasibility in a model is defined by the model's practicality with regard to the current condition as applied to the concepts of teacher training, uncomplicated understanding, and cooperation, and which proves to be worthy of consume human resources.

5.2) Appropriateness is defined as the determination of the appropriateness within the context of Rajabhat University, schools, mentor teachers, and mathematics training teachers, where in the steps, elements, operations, periods of time, and evaluation are appropriate, quality development that display the mentor teacher's competency.

5.3) Adequacy is defined as a model with accurate academic principles and an obvious adequacy of operation processes with purposeful objectives, contents of development, and measurement and evaluation.

5.4) Utility is defined as a model which gives necessary data responding to mentor teachers' needs and relevant organizations in order to utilize the model for users and the development of mentor teachers and training teachers in mathematics learning provisions in the 21st century.

1.6 Expected Benefits Gain

1) The research results of the current condition, the need to improve learning competency relating to mathematic learning provisions, and the supervision done by mentors to enhance mathematics learning in the 21st century would be achieved.

2) The result of this model development and the effective next steps for the mentor teachers' competency to improve mathematics learning provision in the 21st century would be found.

3) The model of developing mentor teachers' competency to enhance mathematics learning provisions in the 21st century would be employed by the teacher trainees as the method to develop the teachers' production professional development.

4) The development of mentor teachers together with teacher trainees creating a professional learning community (PLC) for mathematics learning provisions in the 21st century would be improved.

5) The results of mentor teachers' development together with the teacher trainees creating the professional learning community (PLC) for mathematics learning provisions in the 21st century would be exposed.

6. The network of mentor teachers and teacher trainees adjusting mathematics learning classes for the provisions in the 21st century, in which teachers act as facilitators focused on student thinking methods and various problem-solving skills, would be generated.