

The development in the innovation of the research-based instruction model in the curriculum development course for students of the teaching profession

Ratchakon Prasiratesang¹, Chuanphit Raksa Puek² and Narumon Phu Sing³

Received July 7, 2020; Revised July 17, 2020; Accepted December 9, 2020

Abstract

The R&D research is aimed to: develop an instructional model: curriculum development course by using research-based learning for pre-service teachers. The four steps taken were 1) analyzing, 2) designing and developing, 3) trial, and 4) evaluation. The samples were 60 Thai-major students in the 1st year students from the Faculty of Education, Chaiyaphum Rajabhat University, while enrolled in the second semester of the academic year 2020 who were selected by using multistage random sampling. The research instrument were: 1) a curriculum development knowledge test; 2) an ability evaluation test on the performance of curriculum development. The statistics for the data analysis were percentages, mean, standard deviation, t-test dependent, and content analysis.

The results of this research were as follows:

1. The development of instructional model. The ALDRE Model which comprised : 1) Analyze needs for learning, 2) Learning planning, 3) Develop learning skill, 4) Reflect & knowledge summary and 5) Evaluate & apply. The result of the efficient criterion was 83.56/81.86
2. The differences of students' learning outcomes of students' knowledge before and after being taught by this model were statistically significant at the .01 level. The students' learning outcomes after instruction were higher than before the instruction.
3. The students' ability in project work as a whole is at a high level.

Keywords: Instructional model, research-based learning

Background and the Importance of the Problem

A new paradigm in tertiary education has focused on developing potential learners where knowledge is used to solve problems and to develop professional practices with quality. Higher Education Institute defining the vision and objectives of teaching and learning that in favor of such development has the conceptual framework for changing the critical teaching and learning paradigms that is to focus on the university of research by formulating a strategic plan for the development of higher education institution, which are summarized as follows (Committee of Higher Education, 2006);

- 1) Promote and support research strengthening
- 2) Promote and support teaching and learning excellence
- 3) Stimulate and develop the ability to participate in academic activities of those involved both inside

and outside the higher education institution.

- 4) Expand educational opportunities of the population in a higher education institution
- 5) Seek and develop opportunities for academic cooperation
- 6) Develop infrastructure that mainly facilitates and supports the academic objectives of higher education institutions
- 7) Increase the international role of higher education institutions

According to the goal of the educational strategy of higher education institutions, it has strengthened the connection between research and teaching which will result in higher quality education because it has the potential to use research to solve problems and improve the operation more effectively. The development of teaching and learning process in higher education institutions and educational management today

^{1,2,3} Teachers from the Faculty of Education, Chaiyaphum Rajabhat University

have changed the teaching process from content-oriented to the balanced development of learners in all areas including knowledge and understanding of the subject content, professional practice skills, thinking process skills, problem-solving skills, morality and ethics and development of positive attitude towards the profession.

The development of instructional model in favor of the development of tertiary learners regarding the research-based learning styles, the research process and the learning process are related to higher education institutions that focus on research which will be an institution with outstanding contributions to knowledge creation and will focus on learning management based on research. This is based on the belief that the research process and learning process have common characteristics that are the creation of a culture of searching for knowledge which is the learning process of a person. The research is to gain experience in applying knowledge into practice to create new knowledge which is a process that helps develop the advanced intellectual skills of the researcher. Intellectual process and research process will help learners to develop their learning styles which will benefit the learners for their ability to learn both while studying and after graduation which will make them the learners with continuous learning skills (Ministry of Education, 2002)

Research-based learning management, research-based approach or research-based instruction learning management is a technique in creative teaching that focuses on developing learners to be more creative (Paitoon Sinlarat, 2014) because research is a human development process, especially in the development of researcher resulting the researcher to feel confident in asking questions, questioning, being knowledgeable and creative. Because research is to seek knowledge or to solve problems, the researcher must have initiatives in considering issues or information. The result of this action makes the researcher curious, energetic, rational, in making academic progress since the result of the research or the knowledge gained makes it possible to understand, predict or control the phenomenon while increasing the ability to solve problems (Somwang Phi-

thianuwat and Tassanee Boonterm, 1994). Therefore, research-based learning management should be the learning management that allows learners to learn and practice in seeking knowledge systematically and step by step making students find knowledge by themselves. Or in other words, it is a teaching and learning process that utilizes the research paradigm as a teaching process. The atmosphere of teaching and learning is organized in a way that allows students to use the research process or research results as a tool in learning the content. The research processing may be used to teach the content while the research results can be used as content for learning and the research process may be used for studying the content or allowing students to practice the research directly or to help train students' research skills (Thissna Khammanee, 2012; Paitoon Sinlarat, 2014). It is a teaching method that enables students to do their research so as they know how to solve problems, being analytical, and having skills in seeking knowledge by themselves. It is a learning method that supports the concepts of student-centered teaching and learning that focuses on students to directly search and discover for knowledge by themselves (Paitoon Sinlarat, 2014).

The researcher as a teacher encounters many problems that obstruct the learning the curriculum development subject because the researcher lacks student-centered learning management techniques, and the researcher acts on transferring knowledge to students instead of allowing them to practice. Most of the teaching methods are lectures, explanations through presentation programs while learning of curriculum development is a course that focuses on theoretical content where students need to have the foundation of curriculum, the design and curriculum development, and concentration when studying in the class. Besides, learners need to read more, exploring more additional knowledge, doing a lot of exercises. As a result, some students feel bored, not interested in the class, lack of enthusiasm for study, lack of responsibility in the work and submission of work, or learning productivity of students has poor quality, less cooperation in teaching and learning while they do not dare to express opinions nor

answering questions while studying and having a negative attitude in learning this course resulting effects on academic achievement. Due to these circumstances, it can be concluded that the students' behaviors do not support learning to their full capabilities. As a result, students have relatively low learning development with problems in learning, lack of problem-solving skills which should be developed to increase learning potential. However, problems in the classroom can be solved systematically along with learning management using Research-based Learning and Teaching approach according to the concept of Somwang Phithianuwat and Tassanee Boonterm, 1994; Paitoon Sinlarat, 2014) which state the teaching strategies or teaching and learning styles where teachers can use to make the research to involve in the teaching method which can be classified into 4 groups as follow ; Group 1: Research methodology as a teaching method for students to practice the research at various levels. Group 2: Having students to join a research project with a teacher or as a research assistant in the research work of a teacher. Group 3: Teaching by having students study the research of teachers and leading researchers in a particular field to learn what the frontier of knowledge in one's science. Learn how to solve problems, research results, the principles, and theories used in that research. Learn to apply research results and further research, and; Group 4 Teaching by using research results in teaching for the learners to know that what the current theory and new knowledge of their subjects are. And it is also to build faith for the students towards the teachers. Besides, teachers will have the opportunity to regularly change and develop their teaching methods to be up-to-date.

From the aforementioned reasons, the researcher, therefore, realizes the importance in the development of the research-base instructional model for the curriculum development course for students of the teaching profession with the objective in developing a research-based instructional model for curriculum development for students of the teaching profession and to study the effectiveness of the instructional model based on research. And this research is to encourage learners to acquire knowledge and basic skills for life-

long learning.

Research Objectives

1. To develop the research-based instructional model for the curriculum development course for students of the teaching profession to be 80/80 effective.

2. To study the effectiveness of the research-based instructional model for the curriculum development course for students of the teaching profession, as follows;

2.1 Comparison of knowledge in curriculum development before and after the implementation, according to the teaching and learning process, using research-based curriculum development for teachers.

2.2 Study the capability in developing the curriculum of schools during the instruction according to the learning using research-based curriculum development for teachers.

Hypothesis of the Research

In this research, the researcher assumes the research in the process of model development and the experiment of teaching and learning model as follows:

1. The research-based instructional model for the curriculum development course for students of the teaching profession is developed with the efficiency of 80/80

2. Knowledge regarding curriculum development of teachers before and after implementing research-based instructional model has the statistically significant difference at 0.01 level.

Scope of the Research

This study is the research and development where the scope of research is defined as follows;

1. Population and Sample

1.1 Population

The population in this research consists of 371 students of the teaching profession in the bachelor degree of Bachelor of Education program, Faculty of Education of Chaiyaphum Rajabhat University, the academic year 2019 from 7 programs including Science,

English, Computer, Early Childhood Education, Thai Language, Physical Education program, and Social studies programs.

1.2 Sample used in this research is the first-year students of the teaching profession, the Faculty of Education, Chaiyaphum Rajabhat University, in the semester 2 in the academic year of 2019, and the Multistage Random Sampling method is used for sampling as follows:

Step 1 A random selection for students from 1 of 7 subject areas obtains students from the Thai program.

Step 2 A random selection for a number of students from 2 groups in the Thai program obtains 30 students from 1 group.

2. Scope of Variable

Variables used in this research consist of

1.1 Independent variable is the research-based instructional model, "ALDRE model"

1.2 The dependent variables are;

1.2.1 Knowledge in course development of the curriculum development subject.

1.2.2 Capability to develop the school curriculum.

3. Research Process

3.1 Step 1 Research (R) Analysis (A), the researcher proceeds as follows

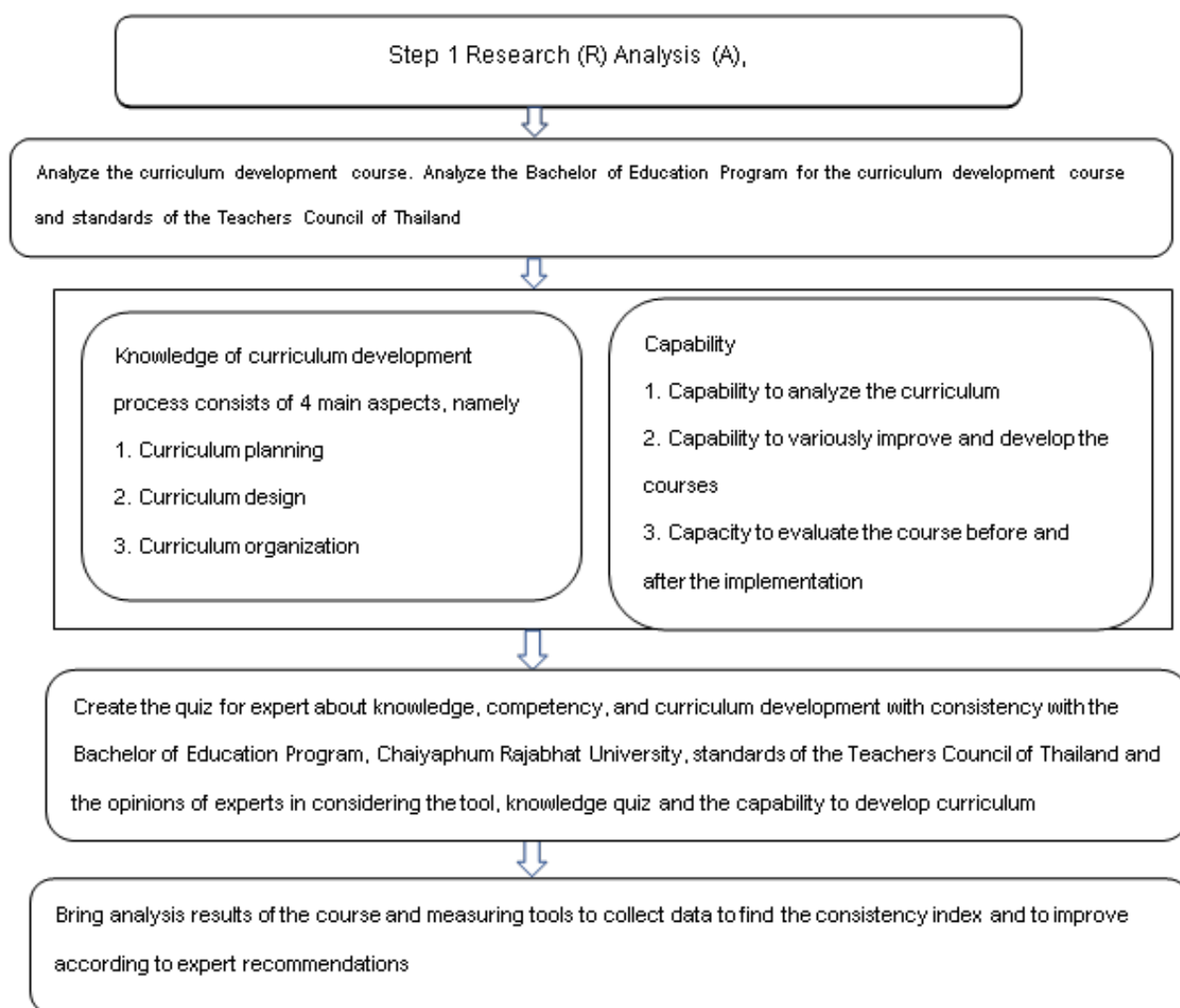


Figure1: Step 1 Research: R, Analysis: A

Step 2 Design and development of the research-based instructional model for the curriculum development course for students of the teaching profession (Design and Development), the researcher proceeds as follows

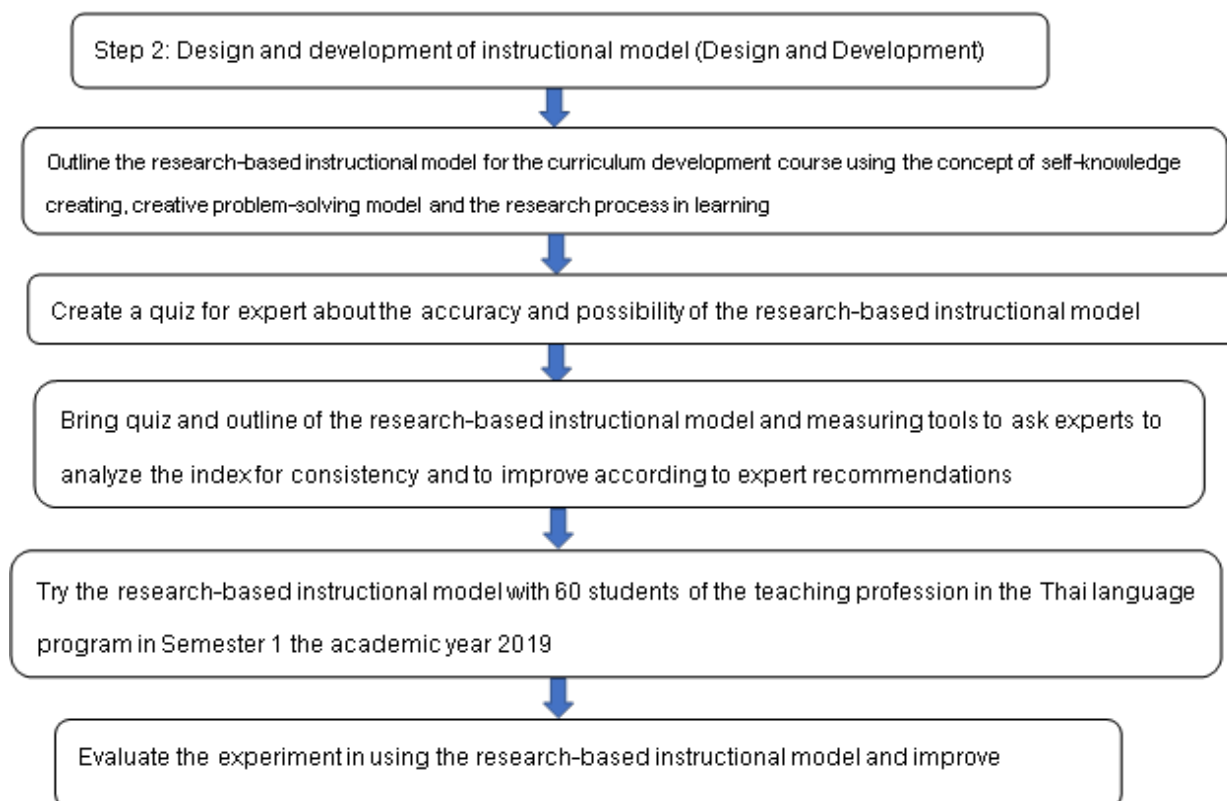


Figure 2 Design and development of the research-based instructional model for the curriculum development course for students of teaching profession (Design and Development)

Step 3 The implementation of developed instructional model (Implementation).

Research methodology.

This research is a pre-experimental research process conducted the 2nd semester of the academic year 2019, 16 weeks, 4 periods per week, during 13.00 - 17.00 hrs as follows

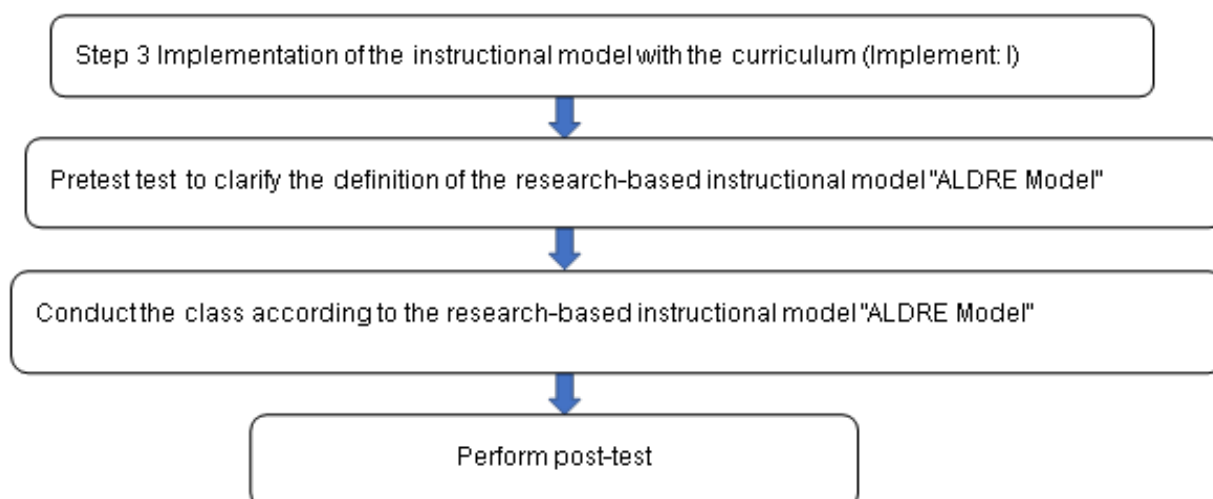


Figure 3: Step 3 Implementation

Step 4: Assessing the research-based instructional model "ALDRE Model" of the curriculum development course for students of the teaching profession (Evaluation: E) the researcher proceeds as follows

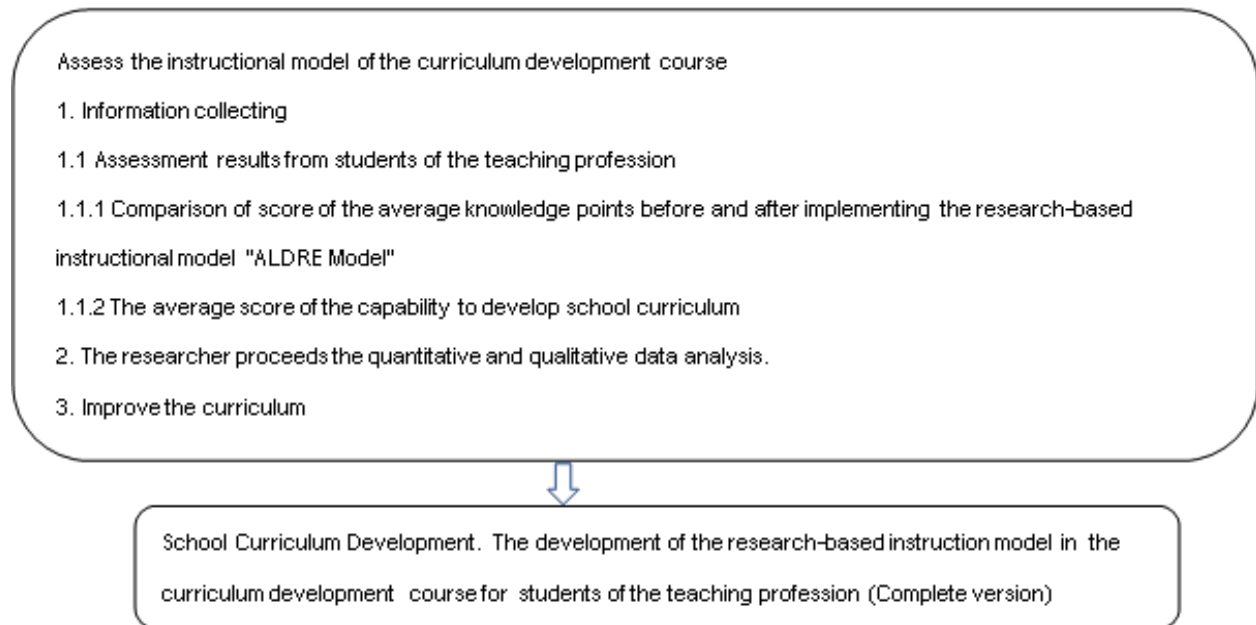


Figure 4 Assessment of the research-based instructional model "ALDRE Model" of the curriculum development course (Evaluation)

4. Tools used for research and data collection

Tools used in the research consist of

4.1 Learning Management Plan for the curriculum development for research-based learning management, "ALDRE Model" consisting of principles, objectives, content, teaching procedures, media/learning resources, measurement, and evaluation including supporting activities.

4.2 Quizzes to test the knowledge of curriculum development in the form of a 4-choice test totaling 40 items.

4.3 Assessment form for the curriculum development, a checklist for items that are graded according to rubric basis.

5. Data collection

The researcher collects data for study according to school curriculum development in the experiment process for the research-based instructional model, the curriculum development course for students of the teaching profession in actual condition by experimenting with pre-experimental research design

which consists of learning activities according to the research-based instructional model for students of the teaching profession called the ALDRE Model, as detailed in the following learning steps.

Step 1: Analyze learning needs to determine the learning objectives of the curriculum development subject and to define the objectives of the curriculum that students must develop.

Step 2: Learning planning: learners plan the learning by themselves, namely;

2.1 Defining self-development strategies or performing activities that help learners learn about the curriculum development process.

2.2 Build calendars and tools for monitoring and self-assessment.

Step 3: Develop learning skills

For the development of learning skills, students study by seeking and using learning resources both in a cooperative learning style and learning in cooperation, using various methods in learning and verifying knowledge related curriculum development process, as follows;

3.1 Finding and using learning resources

3.2 Using various methods for learning

3.3 Knowledge verification.

Step 4: Reflection and knowledge summarization

For reflection and summary of knowledge, teacher encourages students to explain concepts, the process of curriculum development using their language, asking about the evidence and clarity of the student's explanation that uses previous knowledge or previous experience of the student as a basis in explaining. As for knowledge critique, the teacher encourages the learners to expand their knowledge and understanding of the curriculum development process through new experiences. Students are encouraged to apply knowledge to adapt to real-life experiences through the curriculum development process.

Step 5: Evaluate & Apply

As for the assessment of knowledge and understanding, students are encouraged to assess their knowledge and capability, to assess learning progress and to evaluate the achievement of educational goals and students further apply their knowledge and understanding with the development of more new courses.

Data Collection

In this research, the researcher collects data to study the effectiveness of the research-based instructional model, "ALDRE Model" in the curriculum development course for students of the teaching profession as follows;

1. Conduct the test before studying using the test for curriculum development knowledge in the form of a 4-choice test with the sample students and collect data for further analysis

2. The researcher conducts learning management according to the learning management plan for the research-based curriculum management "ALDRE Model" for 16 weeks, 4 periods per week from 13.00 - 17.00 hrs.

3. Once the learning management is completed, perform the test for knowledge of curriculum development using a 4-choice test totaling 40 items, and then collect the data for further analysis.

4. The researcher uses all the obtained data to

analyze using the statistical method and process

6. Data Analysis and Statistics used in the research

6.1 Data derived from the knowledge test is analyzed to compare the values of the median, standard deviation, percentage, and T-test dependent samples

6.2 Data from the assessment of institutional curriculum development is evaluated using a Rubric Checklist for assessing the competency in developing the institutional curriculum into the following scores. 1 point refers to low capability, 2 points refer to middle capability, 3 points refer to a high level of capability.

7. Research Summary

7.1 As for the result of the research-based instructional development "ALDRE Model" for the curriculum development subject for students of teacher profession, the teaching and learning model development is conducted by analyzing for the curriculum development process, the description of curriculum development subject of Bachelor of Education program, Faculty of Education, Chaiyaphum Rajabhat University and the standard 2 of Teachers Council of Standards for the curriculum development. Curriculum development using the curriculum development process to develop into the research-based instructional model for the curriculum development subject for students of the teaching profession consists of 5 issues, namely; 1) Concept and theory about curriculum development 2) Curriculum planning 3) Curriculum design and development 4) Curriculum organization and 5) Curriculum evaluation. And the research-based instructional model for the curriculum development course for students of teacher profession consists of 5 steps as follows: 1) Analyze learning needs 2) Learning planning 3) Develop learning skills 4) Reflect & knowledge summary and 5) Evaluation & Apply, the results of this research reveal that the instructional model is developed with the efficiency of. 83.56 / 81.86 according to the first assumption

7.2 The effectiveness of the research-based instructional model, the results reveal that;

7.2.1 Knowledge of students before

and after learning following the research-based instructional "ALDRE Model" of the curriculum development course for students of the teaching profession, after the teaching, students have higher learning performance than before studying at the statistical significance level of .01, which is in accordance with the 2nd assumption.

7.2.2 The overall capability of students in curriculum development is at a very good level. For each step in the curriculum development consisting of the workload, the presentation, the self-assessment, and the operation according to the curriculum development process, the scores obtained are; 7 students obtain a low level, 14 students obtain a middle level, and 9 students obtain a higher level.

8. Discussion

8.1 The research-based instructional model for the curriculum development course for students of teacher profession ALDRE Model consists of 5 steps as follows:

1) Analyze learning needs 2) Learning planning 3) Develop learning skills 4) Reflect & knowledge summary and 5) Evaluation & Apply. The results of this research reveal that the developed instructional model has an efficiency of 83.56 / 81.86 according to the first assumption. However, this may be due to, firstly, the research-based instructional model for the curriculum development course for students of teacher profession is derived from the analysis in the essence of the curriculum development process that researcher applies the results of the course development program based on the concepts of Tyler (1949), Taba (1962), Saylor & Alexander (1981), Oliva (1992) and Wichai Wongyai (1980). It can be said that the research-based instructional model for the curriculum development course for students of teacher profession that the researcher has designed and developed can help gain knowledge and capability in completing the steps of curriculum development in accordance with the results that the researcher has studied in the curriculum planning model of Kember (2005) and then applied for the course which consists of 5 development processes, namely (1) fundamental data analysis (2) curriculum design (3) curriculum develop-

ment (4) curriculum implementation and (5) curriculum evaluation. In adopting the research-based instructional model for the curriculum development course for students of the teaching profession, it relies importantly on the student-centered instruction concept consisting of steps in learning by creating knowledge by oneself. The instructor encourages students to clarify the knowledge by searching for knowledge from several media both in the form of documents, books, journals, and web-based learning sources, then choose to receive and understand new information. In this process, students will summarize the knowledge into their knowledge and understand that knowledge. Then, students will review, revise, and use new knowledge to reflect and summarize knowledge. The instructor encourages students to expand their knowledge and understanding of the curriculum development process of students through new experiences. There is an evaluation of knowledge and understanding of learning. And students are encouraged to apply knowledge to adapt to real-life experiences through the curriculum development process, to be applied for further curriculum development.

8.2 Knowledge of students before and after learning following the research-based instructional "ALDRE Model" of the curriculum development course for students of the teaching profession, after the teaching, students have higher learning performance than before studying at the statistical significance level of .01, which is in accordance with the 2nd assumption. This may be due to the results that the research-based instructional model allows students to learn the essence of research topics including research design, to study quality research samples, reading the research work conducted from the actual condition of instructional management in the classroom, in schools and communities, applying the learning theory to instructional management, samples of research used in practice for guiding in organizing teaching and learning conditions that support linking between education, research and practice by bringing process and knowledge gained from the research into action and integrate the research process with learning management for use as media for students to learn about teaching to be consistent with the theory. In or-

ganizing instructional activities, the researcher designs to allow students to identify the problems of teachers' research, examine the importance of the problem, and find the answer that leads to the changing by searching for relevant research documents. Once students obtain the answers or guidelines, it will lead to the creation of tools used for learning management and measurement and evaluation of instructional management allowing students to practice good quality research, providing students the opportunity to brainstorm ideas for practical learning, focusing on group work. The teacher plays a facilitator role to monitor students to conduct learning activity smoothly encouraging students to be enthusiastic about their participation. This is consistent with the research results of Thanakhon Phuangkham and Ladda Sila Noi (2011) which found that academic achievement for History subject 2 gained from the research-based instructional management has an achievement score of 70 percent or higher. This is due to students follow the research-based instructional management and students search for information, being enthusiastic to learn, interested in group activities, gaining knowledge from direct experience, gain knowledge that is more permanent beyond memorization alone.

8.3 The overall capability of students in curriculum development is at a very good level. For each step in the curriculum development consisting of the workload, the presentation, the self-assessment, and the operation according to the curriculum development process, the scores obtained are; 7 students obtain a low level, 14 students obtain a middle level, and 9 students obtain a higher level. This may be due to the researcher has obtained the research-based instructional model for the curriculum development course for students of teacher profession that has been developed which has the essence according to the curriculum development process following the development process in 5 steps including (1) basic data analysis (2) curriculum design (3) curriculum development (4) curriculum implementation and (5) curriculum evaluation. This is consistent with Saylor & Alexander (1981) and Ornstien & Hunkins (1998) Since the researcher has tested the quality in accordance with the self-knowledge generation mod-

el (The Constructivist Learning Model (CLM) consisting of 3 steps which are 1) Clarify knowledge by searching for knowledge from various media in the form of documents, books, journals, and web-based learning, 2) Choose to receive and understand new information, and 3) Review, revise, and use new knowledge, such learning approach is consistent with Kember (2005) research that utilizes the curriculum planning model and instructional model of desired outcomes that focus on the mutual agreement in learning activities to achieve desired learning outcomes evaluated by the Student Engagement Project). And the researcher has studied documents related to curriculum development and course description according to the Standard 2 of the Teachers Council of Thailand standards for curriculum development course in the following aspects: 1) Philosophy, Theoretical Concepts of Education 2) Curriculum Theory 3) Curriculum Model 4) Curriculum Type 5) Fundamental Data of Curriculum Development 6) Design and Development of School Curriculum 7) Curriculum Implementation 8) Curriculum Assessment 9) Problems and Trends of Curriculum Development and in the aspect of capability as follows; 1) Capability to analyze courses 2) Capability to variously improve and develop the courses 3) Capability to evaluate the course before and after implementation 4) Capability to create school curriculum. And from attending activities, students learn together that helps to enhance knowledge and understanding even more. There is an exchange of knowledge from the presentations of each group, learning how to define issues from learned situations, being able to analyze issues, knowing how to find suitable methods to obtain the solution, capable to gather information from learning sources while interpreting data and summarizing the learning results to understand. This is the development of students' learning methods resulting in effective understanding and learning.

9. Suggestions

9.1 Suggestions in using research findings

9.1.1 For the effective implementation of the instructional model, teachers should be well prepared to plan activities following mutual learning characteris-

tics. And it should be an atmosphere of encouragement from one another which will make students more interested in studying. And in implementing the instructional model for schools, qualified personnel with knowledge and experience in conducting research must be provided along with the support that facilitates teaching and learning according to the instructional model. And the manual in using the instructional model for a teacher should be also provided that allows participated students to study and understand easily including the guideline for teachers to organize activities and to strengthen good attitudes towards using the instructional model

9.1.2 For the design of research-based learning activities at the tertiary level, the teacher should provide basic knowledge of the research process in the classroom before learning during the orientation so that learners can link to the content of the course. And for the design of measurement and evaluation in learning management, the assessment based on actual conditions should be provided to emphasize students to practice, using the scenarios of good quality research results, study from learning sources, collect data, summarize the result, and perform the presentation. In the assessment, students should be evaluated in many dimensions such as skills, knowledge, capability, thinking, and other characteristics. The methods used for assessment based on actual condition should be varied, in-

cluding observation, interviews, work inspections, student self-reporting.

9.1.3 In the research-based instructional management, the instructor should create a challenging atmosphere, stimulating and encouraging learners with curiosity to solve problems and find the answer. This is to encourage students to feel that they are capable of solving problems or doing activities. And the teacher should encourage them to do or respond including providing examples of success or what students have done before so as students to become confident in their capability and feel proud of themselves resulting in no fear of continuing to do other activities.

9.2 Suggestions for future research

9.2.1 The research and study for the research-based instructional model should be conducted along with the problem-based instructional model for curriculum development and other courses by allowing relevant people to participate since students have to spend time researching additional information outside the class hours.

9.2.2 The research on the research-based instructional model for the curriculum development course for students of the teaching profession should be conducted using other concepts such as online education development, development of subject formats in the form of e-learning, etc.

References

- Biggs, J. B. and Collis, K. (1982). *Evaluating the Quality of Learning: the SOLOtaxonomy*. New York, Academic Press.
- Biggs, J. (1999). *Teaching for Quality Learning at University*. Buckingham, UK: SRHE and Open. University Press.
- Joyce, B. and Weil, M. (1996). *Models of teaching* (5th ed.). London :Allyn and Bacon.
- Kember, David. (2005). Best practice in outcome-based teaching and learning at the Chinese University of Hong Kong. Available from <https://www.cuhk.edu.hk/.../teaching/bestteaching-practice> 13, 14.
- Mariam Nilphan. (2006). *Research Methods in Behavioral and Social Sciences*. 2nd edition Nakhon Pathom: Project for Promoting Textbook Production and Teaching Material, Faculty of Education Silpakorn University
- Ministry of Education. (2002). *Research for Learning*. Bangkok: Council Printing House, Lat Phrao. Faculty of Education, Chaiyaphum Rajabhat University (2019), Bachelor of Education program, Faculty of Education, Chaiyaphum Rajabhat University.
- Oliva. P.F. (1992). *Developing the Curriculum*. 3rded. New York : HarperCollins.
- Ornstein, A and Hunkins, F. (1998). *Curriculum: Foundations, Principles and Issues*. Boston: Allyn & Bacon.
- Osborne, R. and Wittrock, M. (1983). *Learning Science: A Generative Process*, *Science Education*, 67 (4).: 489-508.
- Paitoon Sinlarat. (2014). *Research-based learning*. (3rdEdition). Bangkok: Faculty of Education, Chulalongkorn University.(2014). *Principles and techniques of teaching in higher education*. (4th Edition). Bangkok: V. Print (1991) Company Limited.
- Saylor. J Galen and William, M. Alexander. (1981). *Planning curriculum for schools*. New York : Hott, Rinehart and Winston,
- Somwang Phithiyanuwat and Tassanee Boonterm. *Research Based Learning*. *Journal of Research Methodology* 6 (January-June 1994): 1-14.
- Taba, H. (1962). *Curriculum development; Theory and practice*. New York: Harcourt, Brace AndWorld,
- Tissana Khammanee. (2012). *Teaching Science*. (15thEdition). Bangkok: Chulalongkorn University Press.
- Tyler, Ralph W. (1949). *Basic principle of curriculum and instruction*. Chicago: University of Chicago Press,
- Wichai Wongyai. (1980). *Curriculum development and new dimension teaching*. Bangkok: Roongrueangtham (1994). *Curriculum and instructional process development*, Bangkok. : Suwiya Sarasan.