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Development of Pre-service Teachers' Learning Achievement through the C&C Model

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Abstract

The purpose of this research was to study the learning achievement of pre-service teachers who learned social studies instruction through an instructional model based on cased-based learning and critical thinking (C&C Model). The subjects were 60 pre-service teachers from the College of Teacher Education, Pharanakhon Rajabhat University, Thailand. They were divided into two groups: an experimental group composed of 30 pre-service teachers and a control group composed of 30 pre-service teachers. The experimental instruments consisted of two sets of lesson plans: daily lesson plans based on the C&C model and daily lesson plans based on the regular instructional method. The duration of the experiment was 8 periods which consisted of one period per week and 1 hour per period. The data collecting instrument was a learning achievement test. The data was analysed by arithmetic mean (\bar{x}), standard deviation (S.D.) and was compared by a t-test. The results of this research were as follows: 1) The post-test score of the learning achievement of pre-service teachers in the experimental group was significantly higher than that of the pre-test score at a 0.5 level. 2) The pre-service teachers in the experimental group had a higher learning achievement than the pre-service teachers in the control group at a 0.05 level of significance.

Keywords: C&C Model, learning achievement, pre-service teachers

Introduction

Education is an important foundation for human development. The 12th Education Development Plan of the Ministry of Education (B.E. 2017 - 2021) set the strategies on development of the curriculum, instructional processes, measurements and evaluations. The first strategy is to develop quality instructional processes and to develop activities to enhance learners' skills in a variety of ways which conform to the skills needed in the 21st century. In addition, identify the outputs and outcomes that learners have higher learning achievements, can recite and bring into practice thinking, especially analytical thinking, synthetic thinking, creative thinking, problem solving, and have cooperative skills with others which conform with the 21st century skills (Office of the Permanent Secretary for Education, Ministry of Education, 2008: 51). These are very important areas for students to keep learning. Thus, traditional or regular instructional methods may not require complete learning from learners, causing the lack of complete understandings of what is being taught and yielding unsatisfactory learning achievements (Khansakhorn & Yongyuttawichai, 2015: 319).

In addition, discriminating variables which tended to be the characteristic of high achievers were the M. 6 (grade 12) cumulative grade point average, teaching-learning environments and study methods (Bunchongkalkul, 1996). Tulbure (2012) said that one of the ongoing challenges the university teachers are facing is related to matching the teaching strategies with the students' learning styles in order to improve the academic achievements.

Teachers are regarded as high professions, pre-service teachers in Thailand have to spend 5 years to study the teaching profession based on the curriculum of the bachelor of Education. Therefore, the students who choose to study this curriculum show that they have a good attitude towards their teaching careers, have motivation to succeed, have the intention and commitment to being a teacher. Pre-service teachers need to understand about the five-year course duration, rather than the many other curriculums that take only four years to graduate. In the 5-year teacher education course, students need to study many courses: general education, the teaching profession, specific requirements, and free electives. It ensures the pre-service teachers have a strong academic and also have direct experience on practicum and internship in the school for one year. Therefore, promoting the happiness of learning the teaching profession and high learning achievements are a part of the importance that helps students to learn happily and with quality education (Kongchuay, 2016). Consequently, researchers need to investigate the new instructional model to use in the development of the learning achievement of pre-service teachers. Researchers and the educational team study the development of an instructional model based on case-based learning and critical thinking (C&C) to promote creative problem solving abilities and learning achievements of student teachers in social studies programs. (Kaewpuang et al., 2017).

From the above rationale and significance, the case-based learning and critical thinking (C&C) model can promote these learning achievements. Thus, the researcher used these findings to develop pre-service teachers' learning achievements.

Research Objectives

The objectives of this research are as follows:

1. To compare the learning achievement of pre-service teachers before and after the implementation of the instructional model based on case-based learning and critical thinking (C&C Model).
2. To compare the learning achievement of pre-service teachers between the experimental group and the control group.

Research Questions

The research is designed to answer the following questions: How the C&C model affects the learning achievement of pre-service teachers?

Conceptual Framework

The conceptual framework of this research is using the instructional model based on case-based learning and critical thinking (C&C Model) to develop learning achievement of pre-service teachers.

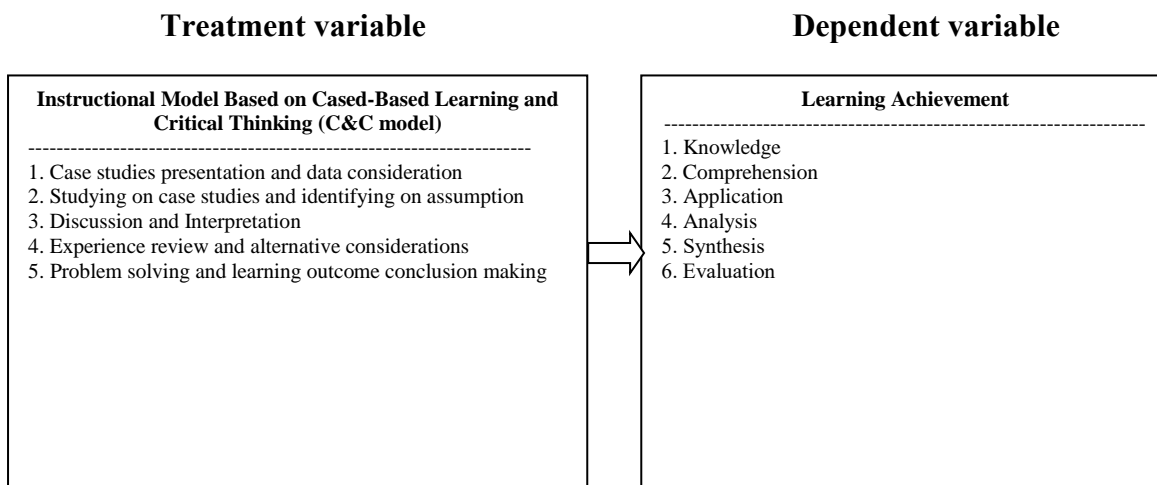


Figure 1. Conceptual Framework

Methodology

This methodology research was designed with the quasi-experimental research. Experimental design is a Two Group Pretest - Posttest design.

Table 1
Experimental Design

Group	Pre-test	Treatment variables	Post-test
E	T1	X	T2
C	T1	~X	T2

- E = Experimental group
- C = Control group
- X = Treatment of the C&C model
- ~X = Treatment of the regular instructional method
- T1 = Pre-test
- T2 = Post-test

Populations and Samples

1. The populations used in this research were pre-service teachers in the social studies program, Bachelor's degree in Education, Rajabhat University in Bangkok, Thailand.
2. The samples in this research were 60 pre-service teachers, who were purposively selected from the Learning Management in Social Studies course at the College of Teacher Education, Phranakhon Rajabhat University, Thailand. The samples represented the population of Rajabhat University in Bangkok, whose characteristics were the same with all the Rajabhat Universities. The samples were divided into two groups: 30 pre-service teachers in the experimental group and 30 in the control group.

Variables

The variables are as follows:

1. Treatment variables;
 - 1.1 An instructional model based on cased-based learning and critical thinking (C&C model)
 - 1.2 A regular instructional method

2. Dependent variable: learning achievement

Time

The duration of the research was between February 2016 - January 2017. The duration of the experiment was the academic year of 1/2016.

Research Instruments

There are two types of research instruments;

1. Data collecting instrument: learning achievement test
2. Experimental instruments:
 - 2.1 Daily lesson plans based on the C&C model
 - 2.2 Daily lesson plans based on the regular instructional method

Experiments and Data Collection

1. Determine the population and select the samples.
2. Ask pre-service teachers in the experimental group and the control group to do the learning achievement test (pre-test) (1 hour).
3. Manage the learning activities based on the C&C model in the experimental group and the regular instructional method in the control group.
4. After all the lessons were learned, ask pre-service teachers in the experimental group and the control group to do the learning achievement test (post-test) (1 hour).
5. Collect and analyse the data.

Data Analysis

The researcher collected the data from each research instrument to statistical analysis. The data was analysed by descriptive statistics including arithmetic mean (\bar{x}), standard deviation (S.D.) and was compared by a t-test.

1. Comparing the learning achievement of pre-service teachers in the experimental group between the pre-test and post-test with the t-test statistic at the significance level of .05 (Dependent t-test).
2. Comparing the learning achievement of pre-service teachers between the experimental group and the control group with the t-test at the significance level of .05 (Independent t-test).

Literature Review

This study is a part of the development of an instructional model based on case-based learning and critical thinking to promote creative problem solving ability and learning achievement of student teachers in social studies program. There were two phases of research methods, phase 1: development of an instructional model based on case-based learning and critical thinking, phase 2: evaluation of the effectiveness of the instructional model based on case-based learning and critical thinking. For this study is the phase 2 of the research. Literature review was presented in 2 parts: the C&C model and learning achievement.

C&C Model

Kaewpuang et al. (2017) developed the C&C model. It is consisted of four key elements: principles, objectives, instructional processes, and measurement and evaluation. Each element is detailed as follows;

Principles. The principles of this instructional model developed from case-based learning and critical thinking, C&C model. This instructional model consists of three main principles;

1. Good learning should give opportunities to learners to analyze, criticize, solve problems, and learn the thoughts of others until can decide what to believe or do to make a reasonable conclusion.

2. Practicing the students to use their ability to link issues, to make decisions, properly and appropriately. It helps learners to gain a perspective that link between old knowledge and new knowledge.

3. When learners consider many things with logical and reflective thinking based on the situation and / or experience received, they will solve problems and make decisions about everyday situations.

Objectives. The objectives of an instructional model based on cased-based learning and critical thinking were to promote creative problem solving ability and learning achievement.

Instructional processes. The content used in this instructional process must be a case study or issues, the newly developed instructional model comprised of five steps;

1. Case studies presentation and data consideration is the step which the instructor or learner presents a case study and set questions for common discussion. It offers a wide range of presentation methods, including the printing, readings, telling or video playing. Then, the learners consider the credibility of the source, context and experience related to case studies.

2. Studying case studies and identifying on assumption are divided into sub-groups as appropriate to learn on a case study. Ask the members to find out the answers to the questions that the instructors set. Provide learners the ability to identify on to assumption about a pre-event, also reflect the experience associated with feelings and ideas.

3. Discussion and Interpretation are the step for discussion of questions to get to the conclusion of the subgroup, present the results of the discussion, consider any events, arguments, messages, and interpret what is happening, as well as what is the misinterpretation of data and principles.

4) Experience review and alternative considerations are step for the learner to review their thinking based on previous experiences, consider the effect of the alternative, judge the value or weight of the choice and consider the effect of the choice at self-selection.

5. Problem solving and learning outcome conclusion making are both the instructor and the learners summarize problems; discuss answers to problems, perspectives and solutions. Then, consider the reason to conclude information reasonably, as well as to summarize the main concept or the idea from the learning. The instructor and the learners evaluate the three learning outcomes: cognitive, psychomotor, and affective.

Measurements and evaluations. Measurements and evaluations of this instructional model both formative and summative assessment was implemented.

1. Formative assessment is measurements and evaluations during learning management using the answering questions method, classroom discussion, and evaluation learners' task.

2. Summative assessment is measurements and evaluations after learning management using the reading learning log and testing of creative problem solving ability and learning achievement.

Learning Achievement

Learning achievement is the results achieved by someone after he makes changes in learning, both at school and outside of school (Nadeak, 2015). In Webster's New International

Dictionary; "Achievement test is a standardized test for measuring the skill or knowledge by person in one more lines of work or a study" (Webster's New International Dictionary, 1951). The learning achievement of this research, the researcher cites from the Taxonomy of Educational Objectives, familiarly known as Bloom's Taxonomy. It's objective of the hierarchical cognitive learning based on Bloom et al (1956) who developed and constructed a group of brain-related behaviors that were important to learning. In 1990, a new group led by Anderson and Krathwohl, a group of cognitive psychologists, curriculum theorists and instructional researchers, and testing and assessment specialists published in 2001 a revision of Bloom's Taxonomy with the title *A Taxonomy for Teaching, Learning, and Assessment* (Anderson and Krathwohl, 2001). The following figures were shown the comparison between old version and new version of Bloom's Taxonomy. It replaced by a verb to describe the different levels of the behavioral learning. For this research, researcher still used the original version because it quit suitable for the multiple choices test (data collecting instrument).

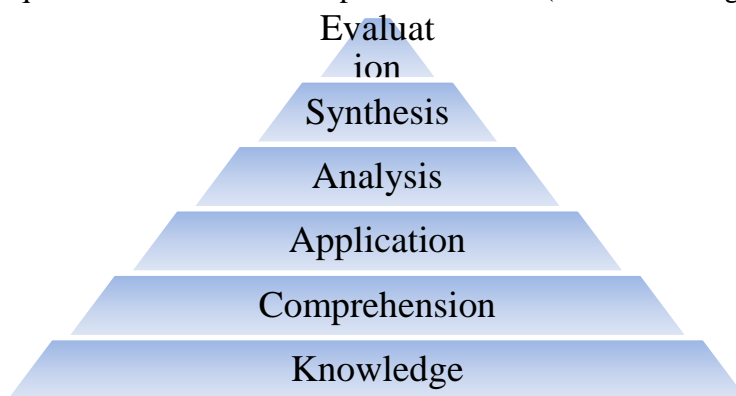


Figure 2. The Original Taxonomy by Bloom et al. (1956)



Figure 3. The Revised Taxonomy by Anderson and Krathwohl (2001)

Findings

The findings or results of the effectiveness of the instructional model based on case-based learning and critical thinking or C&C model were presented in quantitative. The results were shown as follows:

Table 2

A comparison of Pre-service Teachers' Learning Achievement before and after the implementation of the C&C Model

Experimental Group	n	\bar{X}	S.D.	t-test	Sig
Pre-test	30	10.83	3.20	24.685	0.000
Post-test	30	22.63	1.92		

* $p < 0.05$

After the implementation it was found that the post-test score of the learning achievement of pre-service teachers in the experimental group was significantly higher than that of the pre-test score at a 0.5 level.

Table 3

A Comparison of Pre-service Teachers' Learning Achievement between the experimental group and the control group.

Samples	n	\bar{X}	S.D.	t-test	Sig
Experimental Group	30	22.63	1.92	3.759	0.000
Control Group	30	20.00	3.32		

* $p < 0.05$

After the implementation it was found that the pre-service teachers in the experimental group had a higher learning achievement than the pre-service teachers in the control group at a 0.05 level of significance.

Discussion

The results of this research were as follows: After implementation, it was found that the learning achievement of the experimental group was significantly higher than those of the control group at a 0.5 level; and the post-test scores of the learning achievement of the experimental group was significantly higher than that of the pre-test score at a 0.5 level. The results of the research show that the C&C model of developed teaching can improve learning achievements of pre-service teachers when considered by the observation of the activities in the classroom; students can define problems from given situations, explain the key points of the problem, apply knowledge and past experience to solve problems, analyse the causes and effects of problems, offer solutions to social problems from the given situations, and review the experience and options of solving problems. All of this learning behavior is shown in the answers of the research question. Therefore, the results of this research are based on the hypotheses given and consistent with the results of the research of Tantiyanukul (2004) who studied the effects of critical thinking oriented social studies instructions on the learning achievements of mathayomsuksa one students. The research results revealed that social studies learning achievements of mathayomsuksa 1 students who were taught by critical thinking oriented social studies instruction was higher than that of students being taught by conventional instruction at the .05 level of significance. In addition, consistent with the results of the independent study of Busayanon (2012) who studied the thinking skills exercise construction of the economics strand to develop creative problem solving abilities of Mathayom Suksa 2 Students at Sriboonruang School, Chiang Mai Province, the results showed that the evaluations for thinking skills exercises of the economics strand found that it not only creative problem solving but also the economics learning achievement.

By writing the pre-service teachers' learning logs it was found that they were interested in the instructional activities because they challenged their abilities. They learned and shared the ideas with friends, and analysed problem solving issues. Then, review the original experience or the fact that they have relevant experience. It made the pre-service teachers happy to learn, helped the learners to be active, and affected the higher learning achievement. These results are consistent with research by Art-in (2011:79) who state that learning activities allow learners to practice analytical thinking in the given context, story or events, learners will learn the content and practice their thinking including the feeling of happiness and avidity for learning. As a result, the learning achievement has achieved the objectives.

For the application of this instructional model, the researcher organised a training workshop on the Development of Learners' Learning Achievement; it was an academic service for social studies teachers in Bangkok and its perimeter. This workshop affected teachers can now use the C&C model in schools.

Limitations

The limitations of this research were issues and content areas. These areas needed to be analysed thoroughly by experts before being used in the classroom because some of the issues were sensitive to specific group of persons such as belief, religion, value, and human rights. Another limitation was that the developed C&C model can be only used with the learning activities related to the problem and not others. It may be the case study of real events or fictitious events that instructors have to select the meaningful issues or contents in order to fit the learners' situations. Thus, learning style of this instructional model will be able to enhance the learners to study the deep contents and higher thinking skills effectively.

Recommendations

For this research, the researcher has various recommendations both recommendations for research implementations and recommendations for further research. The recommendations were presented as follows:

Recommendations for Research Implementations

Recommendations for Educational Administrators

1. If educational administrators aim to develop the learners in their institute to earn learning achievement, they can use the C&C model as an alternative to the develop their learners students through encourage the instructor to use this instructional model in various subjects which contents on issues such as social problems, economic problems, political problems, environmental problems, and ethical issues.
2. Educational administrators may provide training or workshops to understand the principles, objectives, instructional processes, and measurements and evaluations of the C&C model. Educational administrators should encourage the instructor to design and write lesson plans based on the C&C model.
3. Educational administrators should oversee the effectiveness of the C&C model and ask instructors to report their learning outcomes, including problems and obstacles in teaching and learning to find the solutions.

Recommendations for Instructors

1. Applying the C&C model, instructors should study the four elements of this instructional model for clear understanding.
2. Instructors must select the contents and investigate the case study with interesting

examples or issues that society needs to find solutions, as well as link to the existence learners' in their daily life .

3. Instructors should prepare questions to engage learners to find problem solution and decide the best solutions for the case study.
4. Learning management in classroom, instructors should encourage students to share their knowledge and practice critical thinking in problems considering that they are important for the learner to develop their intelligence and link it to the actual situation.

Recommendations for Further Research

1. Study of the C&C model should be applied to other variables such as learning retention, decision making skills, evaluation skills, etc.
2. Researchers should study the students' satisfaction on learning management with the C&C model in the next time, to improve elements of this model effectively.

Research Benefits

1. Social Studies Pre-service teachers at College of Teacher Education, Phranakhon Rajabhat University developed knowledge and cognitive process through an effective instructional model based on cased-based learning and critical thinking.
2. There is innovative education for Thai and world education; it is an instructional model that can be used to promote learning achievement and creative problem solving.
3. Instructors in the Faculty of Education or College of Teacher Education can apply C&C model to help pre-service teachers to be more creative problem solvers. Pre-service teachers are able to develop other thinking abilities and apply it to everyday life.
4. The instructor in higher education has guidelines for the development of per-service teachers. This guideline can be applied to learning management in each subject. Moreover, the instructors also have the guidelines for creating the instructional model to promote others thinking skills.

Conclusion

In this research is a part of the research and development (R&D) with the title *Development of an Instructional Model Based on Cased-Based Learning and Critical Thinking to Promote Creative Problem Solving Ability and Learning Achievement of Student Teachers in Social Studies Program*. After an instructional model (C&C model) was developed, the researcher evaluates the effectiveness of an instructional model based on cased-based learning and critical thinking or the C&C model by quasi-experimental research. Experimental design is a Two Group Pretest - Posttest design. Effect of the C&C model to learning achievement is effectiveness because it can develop the higher learning achievement. Moreover, the researcher organised a training workshop to disseminate the C&C model to service teachers in school for using this instructional model effectively.

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