Original Paper

Using the Creative Thinking Development Module for Learning Activity Management of Secondary School Teachers for the Enhancement of the Doctor of Philosophy Program

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Abstract

The purposes of this study were to 1) study factors of learning Thai management for enhancing critical thinking of students in schools under the Office of Basic Education Commission, 2) study current contexts and desirable situations, 3) create a teacher leader development program, 4) develop an effective leader development program, 5) evaluate the quality of the developed program, 6) compare the learning achievement scores, 7) study the learning retention of students, and 8) study the students' satisfaction with learning through the developed program. Samples consisted of 14 doctoral degree students. Instruments included the developed program, a manual program by Google Classroom, quality evaluation, achievement test, post-operation record form, and questionnaire. Statistics used were percentage, mean, standard deviation, effectiveness index, and t-test. The results were: 1) the elements of the developed program included 10 elements. 2) The overall current context analysis was found at the highest level. 3) The developed program of learning activity management of leader teachers had 8 modules, including: (3.1) a survey of prior experience, (3.2) collaboration in planning, (3.3) the development of a creative teacher conception, (3.4) the application of a thinking approach, (3.5) practice in the classroom, (3.6) supervision, follow-up, and evaluation, (3.7) feedback and reinforcement, and (3.8) a seminar for enhancing strength outcomes for AAR. 4) The efficiency and effectiveness of the program were: 1) the efficiency of 91.52 (E1) /83.81 (E2) was higher than the committed 80/80 standard, 2) the congruence of utility, possibility, and appropriateness was at the highest level ($\overline{X}$ = 4.79, SD = 0.22), 3) the effectiveness index was 0.6742 which meant students gained more knowledge of 67.42%, 4) the students had significantly higher learning achievement after learning at the level of 0.01, 5) there was no significant differences of learning achievement between after learning and after learning for two weeks, 6) the students had satisfaction on the developed program in the highest level ($\overline{X}$ = 4.95, SD = 0.00), and 7) students had outcome enhancement strengths for AAR, they have higher skills as follows: 1) online learning by Google Classroom, 2) presentation by PowerPoint, 3) criticism and sharing of knowledge, 3) acquiring knowledge, skills in seeking knowledge crystallized.

Keywords: Program Development, Leader Teacher Development, After Action Review: AAR, Creative Thinking for Enhancement, Action Learning

1. Introduction

In the 21st century, knowledge can change as the dynamics of learning. There are some necessary factors: learning and innovation, communication and technology, cooperation, and creating creative innovation. Consequently, learners should have chances to gain knowledge from various sources outside the

classroom to practice analyzing, criticizing, deciding, solving problems, and creating new knowledge, which occurs through the integration of outside classroom activities and inside the classroom. Vicharn Panich (2013: 1-6) stated that teaching is not just about teaching but about being advisors who encourage learners to develop their creative thinking, work together, and create and develop efficient work. Education is not only the answer to change but is also the creator of change. Practicing leads to acquiring knowledge and change from the inside, occurring through leader-teacher skills. Teachers are the key agents of change. After posing questions about problems, curiosities may arise. The teachers should study and find ways to get answers. Consequently, there are several roles of teachers: 1) teachers are individuals who build inspiration, establish learning objectives, pose questions about problems, observe, study, create assessments, provide feedback, and deliver evaluation results; 2) teachers are individuals who prepare learning conditions for learners; and 3) teachers are individuals who possess skills in classroom and student management, and PLC-Professional Learning Community. Prawes Wasee (2020) stated that after COVID19, there are seven new 7 consciousnesses: 1) self-consciousness should be wider, 2) self-consciousness should be open to new knowledge, 3) self-consciousness should be integrative, 4) self-consciousness should be developed, 5) self-consciousness should have new objectives to promote living with the environment, 6) self-consciousness should support people properly, and 7) self-consciousness should remind the end of the old age and the beginning of a new age of human capacity.

As a lecturer at the graduate level focused on developing the innovation program with critical thinking on learning management for secondary school teachers, a case study of the Doctor of Philosophy students in Educational Administration and Leadership in semester 1, 2020 and semester 1, 2021   in the subject of Contrastive Study of Critical Comparative Analysis of Thai Education Management Global and Regional Society (ED41201) by Google Classroom and engineering lecturers participating was conducted. This meant that integrative modules in learning and studying from learners and conducting research could be effective and productive.

Background

The flipped classroom is the new technique of learning management by Jonathan and Aaron, the chemistry teachers at Woodland Park High School in the USA, focus on teaching less to learn more. The flipped classroom comprises online learning, online media, information technology, various communication methods, and activities in the classroom. These support learners in practicing in class. Moreover, they can interact with peers and teachers to create self-knowledge and individualized competency through self-paced learning. In the 21st century, teachers, lecturers, and educational personnel must learn by doing, thinking, and leading themselves to be leaders of change, directing self-learning, assessing, and improving how to learn, and learning in teams. Regarding the study of developing teaching capacity in the project of increasing learning achievement in Northeastern Thailand, Office of the Basic Education Commission by Chalard Chantarasombat, Nothai Udombunyanupab, and Norachai Kenchaiyawong (2018, p. 54-69), they divided their research into 3 levels: 1) developing, creating, defining objectives, and creating instruments; 2) studying theories for 24 hours and training by doing for 66 hours, and 3) increasing the learning achievement of the target groups through the pretest, during the process, and the posttest. The results of the study showed: 1) there were defined objectives, researcher roles, and co-researchers who cooperated with the team, which related to researchers' needs; 2) the teaching capacity was efficient at 90.70/84.58, the index of effectiveness was 0.7946 or 79.64%, and the achievement of the posttest was significantly higher than the pretest at the level of 0.01. After learning, training, and developing for 2 weeks, there was a significantly different average of learning retention; and 3) the teachers' satisfaction was reported at the highest level. This research uses basic knowledge from the development module of developing leading secondary school teachers in creative thinking for the enhancement of students' learning activities in Thailand by Chalard Chantarasombat and Ekanun Sombatsakulkit (2021: 138-149), Chalard Chantarasombat, Yutthasat Kongpet, and Theenada Buntornwat (2022: 17065-17080), Kanok-on Boonmee (17081-17102), consistent with the program in learning management for enhancing critical thinking of secondary students, including 1) the principal of the program, 2) the objective of the program, 3) the goal of the program, and 4) the content of the program development. The content included 9 modules: 1) the survey of experiences, 2) the planning, 3) the concepts, 4) the applied concepts, 5) the classroom implementation, 6) the supervision, monitoring, and evaluation of the study, 7) the feedback and reinforcement, 8) the seminar for strengthening, and 9) the

presentation at the academic conference. The final parts of the module focus on doing activities outside the classroom. The researchers defined activities on learning by doing under continuous advising and help. The learners must have plans and review the principles from the beginning to face real practice. It meant that there were advisors who advised, taught, and gave feedback continuously. This process could enhance understanding. The treatment included training and self-development with 6 steps: 1) preparation, 2) training, 3) understanding, 4) verifying and evaluating, 5) strengthening, and 6) giving feedback. The results from the experts showed the benefits, possibilities, corrections, and suitability at the highest level ($\overline{X}$ = 4.69, SD = 0.42).

Integrating Google Classroom for teaching in classes can change teachers' roles from knowledge givers to tutors or coaches who could be facilitators of learning. Therefore, it is a necessity to enhance teachers' capacities in using online teaching with G Suit for Education and Microsoft tools to improve learning management. Regarding the COVID19 epidemic situation in 2020, online learning was one of the important ways to help learners and teachers at the university level organize remote learning. In semester 3 (April-June, 2020), lecturers chose Google Classroom in teaching the subject of Seminar for Educational Administration (ED8013203) to the master's degree students (Chalard Chantarasombat and Phinit Meekhamtong, 2020: 10-20). The program was effective at 85.67/ 84.00 which was higher than the 80/80 committed standard; the index of effectiveness was 0.7567 or 75.64%, the achievement of the post-test was higher than the pretest. The score of the achievement test after 2 weeks of class completion was not different, which meant that learners could retain learning by learning through google classroom, and learners' satisfaction was found at the highest level after learning via the google classroom, and lecturers chose to google classroom in teaching the subject of Doctor's Degree Contrastive Study of Critical Comparative Analysis of Thai Education Management Global and Regional Society (ED41201) to the doctoral degree students Chalard Chantarasombat, Yutthasat Kongpet, and Theenada Buntornwat (2022: 17065-17080). The program was effective at 90.69/ 81.02 which was higher than the 80/80 committed standard. The index of effectiveness was 0.7947 or 79.47%, the achievement of the post-test was higher than that of the score of the achievement test score after 2 weeks of class completion was not different, which meant that learners could have learning retention by learning through Google Classroom, and learners' satisfaction was found at the highest level after learning via the google classroom.

Research Questions

1. Which factors of learning management for enhancing the critical thinking of secondary school teachers occurred?

2. How was the current and desirable conditions of learning management for enhancing critical thinking in secondary schools?

3 How could the program be examined by experts? How could this program be used with a single team (3 people) and a group team (9 people)?

4. Was the program in the subject of Contrastive Study of Critical Comparative Analysis of Thai Education Management Global and Regional Society (ED41201) for students at 80/80? How?

5. Were the results from the program examined by experts? Possibility? Related? And what level of benefits did the module provide?

6. How much did the index of effectiveness of the program indicate?

7. Did the learning achievement of the program's post-test gain higher scores than the pre-test?

8. How was the learning retention of the module demonstrated?

9. How many levels of student satisfaction did they have?

Research Objectives

1. To study the factors of learning management that enhance the critical thinking of secondary school teachers.

2. To investigate the current and desirable conditions of learning management for enhancing the critical thinking of secondary school teachers.

3. To create a program for leader-teachers of learning management for enhancing the critical thinking of secondary school teachers by google classroom

4. To develop the module in the subject of Contrastive Study of Critical Comparative Analysis of Thai Education Management Global and Regional Society (ED41201) for students by using Google Classroom.

5. To evaluate the quality among leader-teachers of learning management for enhancing critical thinking of the secondary school teachers in the subject of Contrastive Study of Critical Comparative Analysis of Thai Education Management Global and Regional Society (ED41201) through Google Classroom.

6. To compare pre and post-test scores of learning achievement through Google Classroom.

7. To investigate students' retention by using the program through Google Classroom.

8. To examine students' satisfaction with the program through google classroom

9. To write students' outcomes on action learning regarding the strengths of ED41201 for After Action Review: AAR

Scope of the Study

There were 9 units of module learning, including 1) surveying the former experience, 2) planning, 3) creating comprehension, 4) applying ideas, 5) practicing in class, 6) supervision and assessment, 7) giving feedback and support, 8) seminars for enhancing strength outcomes for AAR, and 9) Refection Active Learning by the Profession Learning Community as follows:

1. The Doctor of Philosophy Students in Educational Administratiand Leadership (2019) at Northeastern University.

2. Quality classroom and school community learning, which included: 1) Quality Classroom and School Community Learning and 2) Symposium or Workshop.

3. Developing study and active learning was new for improving learning and teaching by clinic supervisors participating with teachers, administrators, and academic personnel.

4. Profession Learning Community was on duty, teaching, learning, and researching effectively.

Conceptual Framework

The Development Module of Leader Teacher in Creative Thinking for Enhancement of Students' Learning Activating in Secordary School on Ph.D. Students in the Doctor of Philosophy in Educational Administration and Leadership program (Kanok-on Boonmee and Chalard Chantarasombat, 2022: 17087), Chalard Chantarasombat and Ekanun Sombatsakulkit, 2021: 140) had its conceptual framework determined by experts. The innovation of the module consisted of 9 sub-modules, including 1) surveying former experiences, 2) planning, 3) creating comprehension, 4) applying ideas, 5) practicing in class, 6) supervision and assessment, 7) feedback and giving support, 8) seminar, and 9) giving reflection, as explained in Figure 1 below:
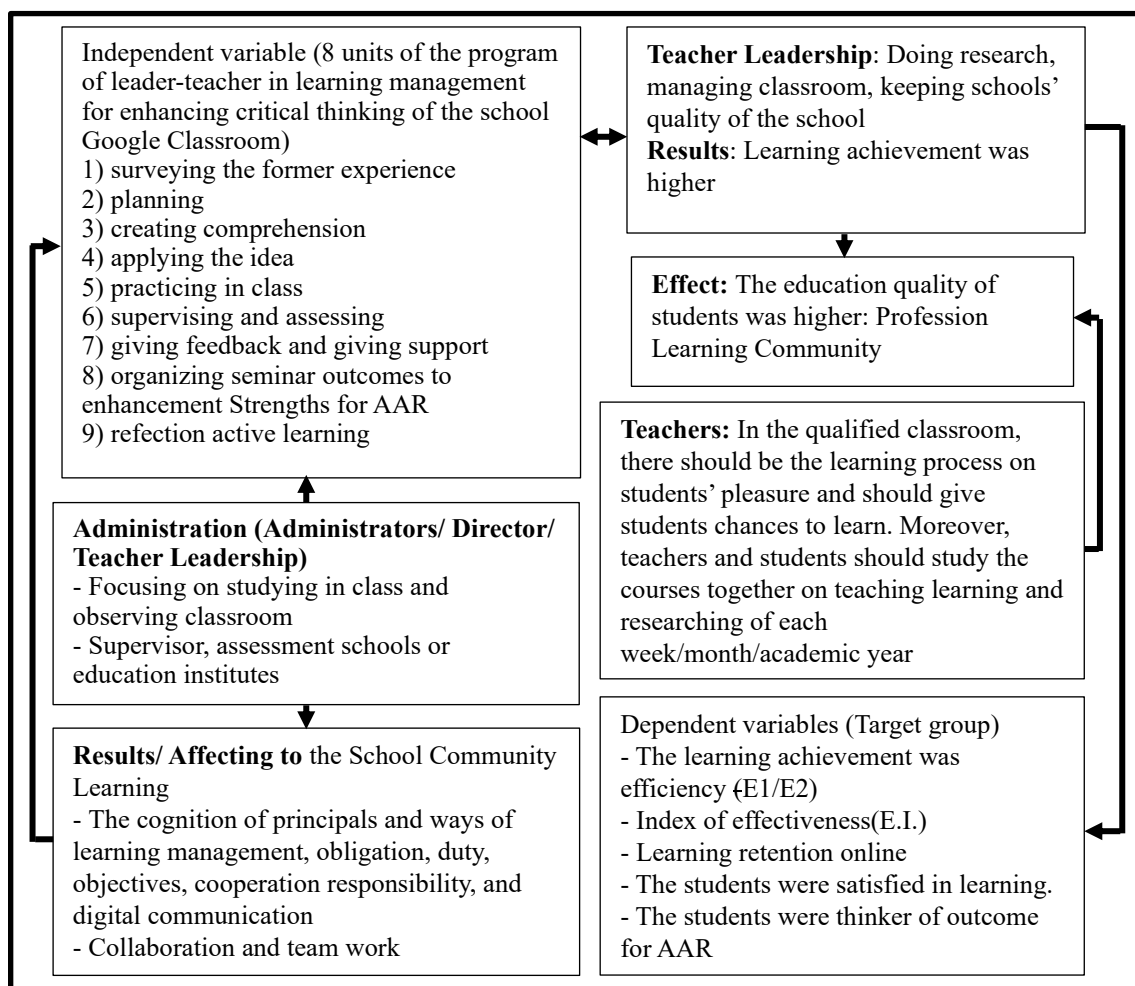
Independent variable (8 units of the program of leader-teacher in learning management for enhancing critical thinking of the school Google Classroom)
1) surveying the former experience
2) planning
3) creating comprehension
4) applying the idea
5) practicing in class
6) supervising and assessing
7) giving feedback and giving support
8) organizing seminar outcomes to enhancement Strengths for AAR
9) refection active learning

Administration (Administrators/ Director/ Teacher Leadership)
- Focusing on studying in class and observing classroom
- Supervisor, assessment schools or education institutes

Results/ Affecting to the School Community Learning
- The cognition of principals and ways of learning management, obligation, duty, objectives, cooperation responsibility, and digital communication
- Collaboration and team work

Teacher Leadership: Doing research, managing classroom, keeping schools' quality of the school
Results: Learning achievement was higher

Effect: The education quality of students was higher: Profession Learning Community

Teachers: In the qualified classroom, there should be the learning process on students' pleasure and should give students chances to learn. Moreover, teachers and students should study the courses together on teaching learning and researching of each week/month/academic year

Dependent variables (Target group)
- The learning achievement was efficiency (E1/E2)
- Index of effectiveness(E.I.)
- Learning retention online
- The students were satisfied in learning.
- The students were thinker of outcome for AAR

Figure 1. Conceptual Framework of the Leader-Teacher in Learning Management for enhancing critical thinking

2. Research Methodology

2.1 Construction and Development of Research Instruments

2.1.1 Steps for Setting and Finding Reliability of the program

2.1.1.1 Brainstorming and planning for developing the program for Doctor of Philosophy students in Educational Administration and Leadership, Northeastern University, Khon Kaen, Thailand.

2.1.1.2 Investigating concepts, theories, principles, policies, and strategies of educational administration on learning 2. in the 21st century. Moreover, the Development of leadership by advising and teaching was studied. Creating and developing the Profession Learning Community, Chalard Chantarasombat and Nothai Udombunyanupab (2560: 2-16), and developing the program for leader-teachers in learning management for enhancing critical thinking of secondary school students in the subject of Seminar for Educational Administration for master's degree students in the major of Educational Administration (Chalard Chantarasombat and Phinit Meekumthong, 2020), the researchers concluded all these references and applied them to create the scope of the study and the program for teacher leadership development.

2.1.2 Handing 9 units of the learning program to 5 experts, including 1) Assist. Professor Dr. Manith Arsanoak and 2) Assoc. Prof. Dr. Sunti Wijakkanaluk, 3) Assoc. Prof. Dr. Tharinthorn Namwan, 4) Assoc.

Prof. Dr. Prasert Reunnakan, 5) Assist. Prof. Dr. Yannapat Srihamonkol, to measure and find the relation between the content and learning module. The results showed that lesson plans were appropriate, feasible, related, and useful at the highest level.

2.1.3 Conducting trials of 9 units of the learning program with groups of students who were not the target group: 1) a group of 3 students and 2) a group of 9 people of the doctoral degree students in Education Administration 1 in Semester 2, 2022. The results showed that the efficiency was at 85.45/81.56 which was in accordance with the set standard. Implementing the 9 units to 14 doctoral degree students in Education Administration at Northeastern University, Semester 1, 2022.

2.2 The achievement test was developed and measured

2.2.1 Investigating related theories, principles, and concepts to create achievement tests based on the theory of Boonchom Srisa-ard (2003: 60-62).

2.2.2 Multiple choices, were applied to create an achievement test with 4 choices and 70 questions, of which 60 were chosen.

2.2.3 After finishing designing the test, it was presented to the same experts to evaluate and find the relation between the behavioral objectives and the test. The criteria for grading test were: 1) +1 when the test was assessed by the the the behavioral objectives, 2) 0 when the test was not clear from behavioral objectives, and 3) -1 when the test was not assessed by the behavioral objectives.

2.2.4 Analyzing the data to find the index of reliability between the questions of the test and behavioral objectives using IOC (Somnuk Pattiyathani, 2001: 167). The reliable test must have a reliability value between 0.5 -1.00.

2.2.5 After finding IOC, the test was administered to 20 doctoral degree students in Education Administration who were studying in Semester 2 of 2019 in the subject of Seminar for Educational Administration to observe students' behavior while taking the test.

2.2.6 After doing the test, the scores were calculated to find the difficulty (P) and discrimination power of each question. After calculating, the results showed that the P value of the test was between 0.40-0.80 and the discrimination power of the test was between 0.20-0.60. Moreover, the reliability of the test was 0.81. This proved that the test was appropriate for implementation.

2.3 The questionnaires for the module comprised 8 parts and 45 questions

2.3.1 Investigating theories, principles, and concepts on the satisfaction of the Transformational Leadership Theories book, theories, research, and educational practices by Thorn Suntrayuth (2011: 5-24).

2.3.2 Studying techniques for conducting the questionnaire by Boonchom Srisa-ard (2005, p. 63-71).

2.3.3 Investigating the development of 5 points rating scale questionnaires.

2.3.4 Creating the questionnaire based on the objectives.

2.3.5 Presenting the questionnaire to the same experts to assess the relationship between the questions and the objectives.

The criteria were;

+ 1 when the statement was related to the behavioral objectives

0 when the statement was not related to the behavioral objectives

-1 when the statement was not related to the behavioral objectives

2.3.6 Analyzing the data to find the index of effectiveness between the questions of the questionnaire and the behavioral objectives using IOC (Somnuk Pattiyathani, 2001: 167). The IOC of the questionnaire was 0.80-1.00. Moreover, the experts suggested that language usage should be edited and rearranged in terms of grammar correction; the sentences should be clearer, and the sentences with similar ideas should be combined into one sentence.

2.3.7 Conducting the trials of the questionnaire with 30 people, including administrators who have gained a master's degree in Education Administration, teachers, and educational supervisors in the Khon Kaen Primary Education Service Area Office, 1 from the project of Coaching Teams to increase the quality of education at Khon Kaen Ice Hotel. The results were analyzed to find the discrimination power (r_{xy}) of each question, and the acceptable values were between 0.32-0.86. The questionnaires were calculated to find the reliability through the Cronbach α -Coefficient by Boonchom Srisa-ard (2005, p. 99-100). The reliability was found to be 0.93 which meant that the developed questionnaire was suitable for implementation in this study.

3. Data Collection and Analysis

3.1 Data Collection

3.1.1 Theoretical knowledge was collected from pre-test and post-test scores of the learning achievement test.

3.1.2 The learning retention was collected after the completion of the developed program within 2 weeks.

3.1.3 The satisfaction was collected from the satisfaction questionnaire.

3.2 Data Analysis

3.2.1 The efficiency and effectiveness of the learning module "The Development Module of Leader Teacher in Creative Thinking for Enhancement of Doctor of Philosophy in Educational Administration and Development and Leadership Program" were analyzed by using the mean and percentage from Chaiyong Brahmawong (1994) as follows:

The efficiency of the learning module was assessed using E_1/ E_2, Formula as follows:

$$E_2 \;=\; \frac{\sum F / N}{B} \times 100$$

$$E_1 \;=\; \frac{\sum X / N}{A} X100$$

3.2.2 The effectiveness index of the learning module was analyzed using the following E.I. formula and was analyzed using the mean and percentage of Chaiyong Brahmawong (1994) as follows:

Effectiveness Index (E.I.) =   The sum of the post-test score – the sum of the pre-test score

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(Student Number X Full Score) - The sum of the pre-test score

3.2.3 The comparison of the learning achievement of the learning module was analyzed through the (dependent sample) t-test by comparing mean values between the pre-test and post-test Boonchom Srisa-ard (2003).

3.2.4 The learning retention was analyzed and compared using the t-test (dependent sample) to compare the post-test score and the score of the test after 2 weeks of program completion by comparing mean values between the pre-test and post-test Boonchom Srisa-ard (2003).

3.2.5 The satisfaction in the learning module was analyzed using the mean value ($\overline{X}$) and Standard Deviation (S.D.), by comparing mean values between pre-test and post-test Boonchom Srisa-ard (2003).

4. Research Results

Table 1. Process Efficiency vs. Effectiveness of Results for Developing Knowledge Managers in Leader Teacher in Creative Thinking

| Number | Score after 2 weeks (60) | Pre-test (60) | Practical Score for program | | | | | | | Total Practical (160) | Post-test (60) |
			Learning Goal (40)	Consideration (20)	Content (20)	Instruction (20)	Evaluation (20)	Feedback (40)		
1	58	40	38	18	18	18	18	38	148	49
2	58	38	38	18	18	18	18	39	149	56
3	58	41	37	18	18	17	17	38	145	52
4	53	39	37	18	17	18	18	38	146	54
5	57	34	37	18	18	18	18	37	146	50
6	58	30	37	18	18	18	18	38	147	50
7	59	34	37	18	18	18	18	38	147	52
8	58	28	37	18	17	18	17	38	145	50
9	60	28	37	18	17	17	18	38	145	51
10	60	26	38	17	18	18	17	38	146	50
11	58	27	38	18	18	18	17	38	147	48
12	58	29	38	17	17	18	18	37	145	47
13	58	52	37	18	18	18	18	38	147	50
14	57	24	38	17	18	18	18	38	147	45
Total	**810**	**470**	**524**	**249**	**248**	**250**	**248**	**531**	**2050**	**704**
$\bar{X}$	**57.86**	**33.57**	**37.43**	**17.79**	**17.71**	**17.86**	**17.71**	**37.93**	**146.43**	**50.29**
S.D.	**1.66**	**7.71**	**0.51**	**0.43**	**0.47**	**0.36**	**0.47**	**0.47**	**1.22**	**2.76**
$\bar{X}$ **%**	**96.43**	**55.95**	**93.57**	**88.93**	**88.57**	**89.29**	**88.57**	**94.82**	**91.52**	**83.81**

The results of the implementation of the leader teacher development program in enhancing students' critical thinking of students developing Knowledge Managers in leader teachers were as follows:

4.1 The program had an efficiency of the learning outcome (E1 / E2) at 91.52/ 83.81 higher than the criteria of 80/80.

4.2 The evaluation from the experts on the teachers of the program found that the benefits, possibilities, corrections, and suitability were at the highest level ($\bar{X}$ = 4.95, SD=0.00).

4.3 The effectiveness index was at 0.6742 explaining that students gained a higher knowledge of 67.42%.

4.4 The students who learned through the program achieved significantly higher results at the level of .01.

4.5 After the completion of the developed program, the students obtained similar scores on both the post-test and the test of 2 weeks after program completion. It showed that students had learning retention after learning through the developed program.

4.6 The students' satisfaction with the developed program was at the highest level ($\overline{X}$ =4.95, SD=0.00). The highest level of mean values ranking from the descending order was: 1) lecturing and providing the Learning Activity Management by lecturers and students, and 2) the enhancement of a student support system; satisfaction was at "the highest" level ($\overline{X}$ = 5.00, S.D. = 0.00).

4.7 The attitudes in the After Action Review-AAR on the subject of Critical Comparative Analysis (ED41201) involved applying Google Classroom with 9 units: studying and giving presentations, asking, answering, summarizing, applying with learners, and adapting to everyday life. Of 6 factors, there were 14 people who shared the idea equally at 100 % and among the 14 people, there were questions that occurred.

5. Conclusion

The factors of critical thinking for secondary school teachers comprised 10 factors: 1) various learning activities, 2) motivated activities, 3) learning activities in different places, 4) learning activities in the child center, 5) technology in learning management, 6) activities related to daily life, 7) innovation in learning activities, 8) activities that cooperated with the community, 9) activities focused on teaching morals, and 10) activities that were assessed and evaluated.

5.1 The current condition of learning management was reported at a moderate level, and the desirable condition was at the highest level.

5.2 The module in learning management for enhancing critical thinking included: 1) the principles of the program, 2) the objectives of the program, 3) the goals of the program, 4) the content of the program, which included 9 modules: 4.1) the survey of experiences, 4.2) the planning, 4.3) the concepts, 4.4) the applied concepts, 4.5) the classroom implementation, 4.6) the supervision, monitoring, and evaluation of the study, 4.7) the feedback and reinforcement, 4.8) the seminar for strengthening outcomes to enhance strengths for AAR, and 9) reflective active learning. The treatment included training, while the self-development consisted of 6 steps: 1) preparation, 2) training, 3) understanding, 4) verifying and evaluating, 5) strengthening, and 6) giving feedback. The results from the evaluation showed the benefits, possibilities, and suitability reported at the highest level.

5.3. After using the module, the results showed:

5.3.1 The module had the efficiency of the learning outcome (E1 / E2) of 91.52/ 83.81 higher than the criteria at 80/80.

5.3.2 The evaluation from the experts on the teacher of the program found that the benefits, possibilities, corrections, and suitability were found at the highest level ($\overline{X}$ = 4.95, SD=0.00).

5.3.3 The effectiveness index was at 0.6472 explainings that students gained a higher knowledge level of 67.42%.

5.3.4 The students who learned through the program achieved significantly higher results at the level after .01.

5.3.5 After the completion of the developed program, the students-gained similar scores on both the post-test and the test after 2 weeks of program completion. It showed that students had learning retention after learning through the developed program.

5.3.6 The students' satisfaction with the developed program was at the highest level ($\overline{X}$ =4.95, SD=0.00). The highest level of Mean values rankatg from the descending order were: 1) lecturing and providing the learning activity management by the lecturer and students, and 2) the enhancement of the student support system; satisfaction was in "the highest" level ($\overline{X}$ = 5.00, S.D. = 0.00).

5.3.7 The students had outcome enhancement strengths for AAR higher as follows:

1) What do you gain from this subject?

1.1) Online learning through Google Classroom,

1.2) Presentation through PowerPoint, 3) Criticism and sharing of knowledge,

1.3) Acquiring knowledge and skills in seeking knowledge crystallized from Professor Dr. Kriengsak Chareonwongsak,

1.4) Higher skills are as follows:

1.4.1) Online learning through Google Classroom,

1.4.2) Presentation through PowerPoint,

1.4.3) Criticism, sharing, and exchanging knowledge, and

1.4.4) Acquiring knowledge, crystallized knowledge acquisition skills for teachers,

1.4.5) Educational standards of countries in America, Europe, Australia, and Asia, such as Singapore, Japan, and China, comparing Thai and foreign education using PISA innovation.

2) After learning, should this subject be adapted to careers or organizations?

2.1 Review, analyze, and study the availability of policies for Thai Studies and World Management and bring fundamental factors, formats, methods, products, and effects to manage the education of the the next 10 years based on the MOU in Korea at Renaissance in 2015 and 3Rs & 8Cs in 21st century by using PISA; UNESCO has required 77 countries to manage education steadily.

2.2 To be a Professional Learning Community (PLC), should be networks between learning management inside and outside the classroom.

2.3 Institute means a school of life and learning by doing, which means teaching and learning with learners. To strengthen the institutes steadily, learning sources should conduct research and develop innovations to increase the value of the institute and learning sources.

2.4 "Long live learning" is influenced by teachers and experts, which brings happiness to people in the period of Multicultural Education. Learners had chances to build the Programmed Instruction systematically, which was criticized for identifying strong points and weak points in developing the subject of Critical Comparative Analysis.

6. Discussions

6.1 There were 10 factors of critical thinking for secondary school teachers: 1) teachers prepared various learning activities, 2) teachers presented motivating activities, 3) teachers offered learning activities in different places, 4) teachers offered to learn activities, 5) teachers used technology in learning management, 6) teachers offered activities related to daily life, 7) teachers used innovation in learning activities, 8) the activities cooperated with the community, 9) the activities focused on teaching morals, and 10) the activities were assessed for suitability at the highest level (Suttinun Pakdiwut, 2013: 110-112).   Results of the evaluation from the experts showed agreement at a high level. When considering each factor, it was found that the experts agreed that teachers should prepare various learning activities and implement technology in learning management. This meant that teachers had to use new and appropriate activities in learning management. Thikumporn Bunmak (2015: 294) conducted research on developing the teachers' system in learning management with 7 steps: 1) defining the objectives, 2) studying students' characteristics, 3) defining the goals of learning, 4) defining the content, 5) managing learning activities, 6) assessing, and 7) giving feedback. This is consistent with the research of Chalard Chantarasombat and Chaiyuth Sirisuthi (2022: 74) conducted research on developing the teachers' system in learning management with 6 steps: 1) preparation, 2) training planning, 3) understanding, 4) verification and evaluation, 5) strengthening, and 6) giving feedback. Additionally, Kanok-on Boonmee and Chalard Chantarasombat (17081-17102) conducted research on developing the teachers' system in learning management with 7 steps, as follows: 1) defining the objectives, 2) studying students' characteristics, 3) defining the goals of learning, 4) defining the content, 5) managing learning activities, 6) assessing, and 7) giving feedback. After using this system, it was found as follows: 1) teachers gained more knowledge in learning management at a high level, and 2) teachers could manage activities in class and understood the process of learning management in school. The factors of learning management comprised: 1) presenting problems, 2) individual thinking, 3) group thinking, 4) presenting and discussing, and 5) thinking critically.

6.2 The current condition of learning management for enhancing the critical thinking of school students in the area of technical education or the Primary Education Service Area Office was found at a moderate level, while the desirable condition was reported at a poor level. When considering the content by ranking from the highest to the lowest, self-study was the highest. The Ministry of Education (2009, p. 8-9) stated that learning management in child centers was accepted based on the concept was able to study and improve excellently. The Thai language is the signature of our country because it enhances the characteristics of Thai people and serves as a tool for communication. Moreover, the Thai language is a necessary skill to practice until communication is successful in terms of gaining knowledge and adapting to daily life. The Office of Thai Education Council (2010: a-d) conducted research about the policy of developing teachers and educational personnel and found that: 1) most teachers did not graduate in the major that they had been teaching; they had too much workload and lacked knowledge of learning management; 2) regarding the condition of learning management, found that although learners had been trained, there were some problems arising from the environments, and the learning achievement was low. This might be due to: a lack of desirable characteristics, lacking critical thinking, lacking solving skills, and lacking creative thinking. When considering the factor of educational personnel, it was found that the difficulties of the organizational structures and administration could cause problems, a lack of qualified teachers, and a lack of finding qualified people. 5.3 The program in learning management for enhancing critical thinking was presented to 5 experts for evaluation; the results revealed that the developed program was at a high level ($\bar{X}$ =4.69). When analyzing the effectiveness of the program, it was found that the program's efficiency was at 85.45/81.56. This revealed that in creating and developing the program, the basic information, conditions, problems of learning management, and teacher development were analyzed to identify issues in development. Furthermore, the investigation of the scope of the study, theories, and related reviews in learning management for enhancing critical thinking was conducted to critique the occurring factors. Questionnaires were used to support secondary teachers for supporting them to get the rewards for the innovation of learning management in northeastern Thailand. The data from 136 people answering the questionnaire with 9 modules and factors were examined by 5 experts. After that, all factors were combined and defined to find the details to form the program and documents for presentation to 5 experts later. According to the above information, this program was developed through theories and research and was properly examined by experts, leading the program to be effective and efficient, which responded to the objectives of the program of creating knowledge, comprehension, a good attitude, and teacher skills for managing learning activities creatively. There were 3 parts for evaluating the module, comprising comprehension, good points of view, and learning management for enhancing the critical thinking of secondary school teachers. According to Boone (1992, p. 49) and Yodanong Jomhongphitak (2012:   157), there were three ways of developing personnel, including concepts, principles, and planning, which could be described as follows: 1) There was planning for creating and developing the program. The researchers defined the vision and created the structure of the program to achieve the objectives of the program and enhance the participants in the experiment to have a vision and critical thinking in learning management. 2) There was the design and implementation of the program. The instruments included facilities and a guidebook. 3) There was assessing and examining. There were fundamental concepts to define the schedule of the program, including concepts, participatory learning, advising, practicing, supervision, suggestions, giving feedback, and the theories related to the nature of teachers.

7. The module could enhance understanding, attitudes, and skills in learning management, as discussed below

7.1 The comparison of the teachers before and after using the program found that teachers achieved a significantly higher score at the level of .01. This meant the designed activities in phase 1 could develop critical thinking in the learning management of secondary school teachers. In the scenario of the target group, there was knowledge and understanding in stimulating self-improvement techniques to manage the classroom creatively. The roles of the teachers included creating learning activities, sharing knowledge, criticizing, analyzing, understanding, and motivating themselves to change learning management by using various activities for the target group. Consequently, using demonstrations could help the participants gain knowledge, clearly understand, observe the format, practice the scenario, give advice, and provide feedback. Wirote Sararatta (2008, p. 207) presented the principles for developing teachers: 1) realizing in learning phycology of adult learning, 2) understanding the results after

developing teachers, 3) encouraging teachers to think about how to work systematically, 4) developing teaching to be self-learning, 5) changing the approach to teacher development from the old system to the new system, 6) viewing teacher development as part of regular duties, and 7) emphasizing learning in class, learning from other teachers, and learning from other staff in the school and community. Hence, when improving teaching through that scope, teachers could comprehend how to manage learning activities well.

7.2 The comparison in learning management before and after using the module found that teachers had skills in learning management significantly higher at the level of .01. This meant that phase 2 of the program focused on doing activities outside the classroom, especially activity 6: implementing the plan, and activity 7: supervising and evaluating, which encouraged teachers to develop plans and review the principles from phase 1 to face real practice. It meant that there were advisors who provided guidance, taught in the program, and gave continuous feedback. This process could create understanding, retention of knowledge, and deep comprehension in learning management creatively. Vicharn Phanich (2013, p. 41-45) and Waist Wiangsmute (2009, p. 56) mentioned that developing teachers to have skills in learning management must use various techniques that would be useful and necessary. Since enhancing skills in learning management creatively, understanding individual differences would be recognized, as it led to the skills of designing learning management individually.

7.3 The efficiency of the developed program was at 86.79% of the total scores of activities and practices /83.03% of the total scores of achievement tests were higher than the committed 80/80 standard. The index of effectiveness was 73.97 % which meant that students had retention in learning, although 2 weeks after the completion of the module. This could be concluded that: 1) there was learning management for students focusing on a child-centered approach. Learning management by enhancing knowledge helped improve students' abilities. So, the developed activities helped support learners in practice because it could improve learners' abilities and may be important for studying. Pimpan (2011, p. 7) mentioned that learning with a focus on a child-centered approach was to emphasize that learners acquire new knowledge and new inventions through the thinking process, social process, and enhancing learners' application applying to learn. Moreover, the module of learning was evaluated at the highest level, which affected other learning modules. Besides, students could study through learning modules that could be challenging for their capabilities. The different activities of the program were arranged from easy to difficult. The results after the study revealed that students' learning was effective at 84.67/83.00 and there was no difference between the score of the test in the last class of the program and the score of the achievement test after 2 weeks of the completion of the program. This meant that students had learning for retention (Chalard Chantarasombat, 2020: 31-50), 2) After learning via the developed module, which was the inspiration in learning management, it also, was the support of learners in developing analytical thinking. Chalard Chantarasombat (2020, p. 31-50) proposed that the index of effectiveness in the learning management of students in the module about the policy of strategies (EDA6201) was 0.6577 or 65.77%. This clearly indicated that students gained more knowledge than 65.77. Moreover, the evaluation and assessment of knowledge, practice, attitude, behavior, checking assignments, doing exercises, and informing results helped improve learning activities and to be the learning tools without complex but easier to understand, provided inspiration, and offered a clear understanding to achieve higher learning achievement. This meant that students could develop learning by studying through the developed module of learning effectively and efficiently. Additionally, Rungarun Papapsit (2018: 65–67) studied the innovation for developing potential in conducting research in the classroom, a case study of self-access learning design and guidance, and proposed that students' learning achievement was higher than before learning from studying via the learning model, with significance at the level of .05, and Chantarasombat and Boriboon (2023) report in the learning module development, entitled, internal supervision in Schools for Students of R&D Research," and the report implied that the students possessed higher learning achievement in the internal supervision in schools after learning than before learning at the statistical significance level of 0.01.

7.4 The students were satisfied with teachers' classroom management for the development of teachers teaching Thai to enhance the critical thinking of the students in secondary schools in the course Seminar in Education (ED8013302). On average, the satisfaction was scored at the highest level, which indicated that the students could learn from learning modules containing interesting and various activities to draw

their attention effectively. In addition, learning by doing and participating in activities was developed based on the individual differences of students regarding the ideas, theories, and principles of learning module instruction. This was consistent with the study of Chompan Na Ayutthaya (2536: 83-85) which found that to create the learning program, there were 13 steps: 1) The designers needed to consider the general objectives of the curriculum and carefully evaluate the objectives of the designed lessons to enhance the graduates' potential in general objectives. In addition, the designed learning activities were necessary to be consistent with the philosophy of the learning curriculum. All of these issues should be clarified in the principles and rationales of writing: 2) There should be a specification of learners' potentials that students are going to learn, 3) After specifying the objectives, the course designers must set the basic necessary potentials for students. The potentials should be limited to the specific topics as truly basic standards for each lesson. The basic potentials should be specified to create a flexible learning program and to provide students the opportunity to select what they want to learn, 4) For the primary evaluation form, the designer should ensure that the criteria for the evaluation can assess the students' potentials according to the objectives. The evaluation must reflect the truth and provide feedback to students. The assessment will be effective when the designers consider the practices that could help diagnose mistakes, 5) To design learning activities, the designers should try different alternatives so that they can choose what they want to learn and help them succeed, as well as select the appropriate learning approach to assist them. Moreover, students should have the opportunity to create learning activities with the help of the teacher, 6) The designed learning activities should be well organized appropriately to help students understand the arrangement of the plan, and 8) The evaluation after learning should be done in the form of suggestions for designing primary evaluations and reliable tests, 9) The designers may create a supplementary activity based on specific situations. After completing the learning program, complementary activities could be used as learning activities for students. 10) The description of the module must be short and clear. 11) The designers should have other colleagues critique the designed learning activities to improve the efficiency and effectiveness of the lessons. 12) After completing the lesson construction, the designers should review the lesson again to focus on the potential related to the development of students and to be the best example of the effectiveness of learning and teaching. 13) In the last stage, the designer needed to realize that the designed lesson could be changed, which might affect students' satisfaction in learning with the learning model.

7.5 The students had outcome enhancement strengths for AAR: they have higher skills as follows: 1) Online learning using Google Classroom, 2) Presentation through PowerPoint, 3) Criticism and sharing knowledge, 3) Acquiring knowledge and skills in seeking knowledge, 4) Higher skills: 4.1) Online learning through Google Classroom, 4.2) Presentation through PowerPoint, 4.3) Criticism, sharing, and exchanging knowledge, 4.4) Acquiring knowledge and crystallized knowledge acquisition skills for teachers, 4.5 Educational standards of countries in America, Europe, Australia, and Asia such as Singapore, Japan, and China, comparing Thai and foreign education using PISA innovation, currently involving 77 member countries from UNESCO. In accordance with the study, students are interested in solving problems in the creative thinking. Therefore, they jointly learn with the teacher to lead learning by using programmed lessons with their own learners, totaling 3 units of satisfactory learning. The learning that has been achieved has increased according to the achievement of educational management. New concepts in education reform towards internationalization and the main related aspects were: 1) Morally and ethics are at an appropriate level; 2) Knowledge and understanding are at a reasonable level; 3) Intellectual skills are at a reasonable level; 4) Cooperation and consciousness are at the appropriate level; 5) Numerical skills and presentation of information technology are at a good level; and 6) Educational management and leadership skills are at an appropriate level (Chalard Chantarasombat and Tharika Phumsathan, 2022: 1276).

8. Recommendations

8.1 Recommendations for Application and Development

According to the results of the research, the designed teacher leadership module or program could help improve teachers' knowledge, understanding, positive attitude, and skills in learning activity management with creativity. However, there were some suggestions for application as follows:

8.1.1 The administrators and those who are involved with the development of the quality of education and teachers in the secondary education service area and in other educational institutions should apply the designed module or program, which is systematically proven by the experts and experimented with to be authentically effective for developing teachers to be knowledgeable and skillful.

8.1.2 Implementing the designed teacher leadership program for learning management to enhance the critical thinking of secondary school teachers was effective with the objectives of the module, the process of using the program continuously in both in the theoretical part of creative thinking development and the practical part in which secondary teachers practiced teaching in real situations. These processes would help the teachers participating in training to be capable of implementing knowledge and experience from learning systematically. Evaluation and follow-up sessions were needed to assist with teachers' suggestions and guidelines, as well as advice for teachers during all stages of the program.

8.1.3 Process of learning activities in the creative thinking development program focused on practicing to enhance learning management skills for teachers. The program needs to emphasize that teachers participating in the development program follow all the stages specified for the module with the support of school administrators and stimulate school supervisors and teachers' colleagues to enhance teachers' knowledge, understanding, and positive attitude, as well as their teacher leadership skills in learning management with the objectives of the program.

8.2 Recommendations for Future Research.

8.2.1 For teachers, there should be a study of the development of teachers' creative thinking in other aspects to cover all teachers' tasks in doing the project or in providing students' assistance and designing teaching materials.

8.2.2 For further research, there should be a study to develop the critical thinking of teachers who teach Thai through other techniques in order to compare the results of each technique in developing teachers' critical thinking for learning activity management.

8.2.3 The suggestion for further research is to investigate whether the knowledge and understanding, skills, and attitudes of teachers are related to creative learning activities in the online module in Google Classrom.

References

Adisak, J. (2015). *Modules of Mechanic Engineering for High Vocational Certificate.* The 5th National Conference on Technical Education, Faculty of Industrial Education, King Mongkut's University of Technology North Bangkok. 5-6 July 2020, p. 133.

Aleksandra, S., & Maris, C. (2009). Development of Creativity of Prospective Visual Art Teachers. *Journal of Teacher Education for Sustainability: Daugavpils University, 11*, 86-96.

Aporn, P. (2005). *Career Development in Practice*. Bangkok: HR Center.

Arunrung, P. (2018). *Education Innovation for Doing Research in Class by Creating Learning Materials by Yourselves and Giving Advice in Class*. Research report. King Mongkut's University of Technology North Bangkok.

Boone, E. (1992). *Developing Program in Adult Education*. New Jersey: Prentice Hall.

Boonmee, K., & Chantarasombat, C. (2022). Using the Development Program of Leader Teachers in Critical Thinking on Google Classroom for Enhancing the Doctor of Philosophy Program in Educational Administration and Leadership. *International Journal of Special Education, 37*, 17081-171020.

Brahmawong, C. (1994). *Teaching Set Measurement: Teaching Material for Technology and Educational Communication Unit 1-5*. Bangkok: Sukhothaithammathirat University.

Chaimayo, T. (2016). Lesson Plans for Supervision Using Classroom Innovation to Enhance the Environment of Supervision at School. *Journal of Supervision and Educational Development, Mahasarakham University, 1*(1), 124-137.

Chantarasombat, C. (2018). *Coaching Teams with Achieving the Education Quality*. Office of the Permanent Secretary, Ministry of Education in Khon Kaen and Pitchayabundit College.

Chantarasombat, C. (2020). Development of Modules on Policy and Strategies for Education (EDA6201) for Master Degree Students in the Major of Education Administration. *Education Journal, Maha Sarakham University, 14*(1), 31-50.

Chantarasombat, C., & Meekhamtong, P. (2020). The Development Program of Leader Teachers in Learning Thai Management to Enhancing Students' Critical Thinking Ion Secondary Schools Through a Course Seminar for Master Degree Students in Educational Administration. *Educational Research, 11*(1), 10-20.

Chantarasombat, C., & Rooyuneyong, W. (2020). The Development of Learning Module of Educational Administration and Educational Institute for Students in the Master of Education Degree in Thailand. *World Journal of Education, 10*(3), 19-32.

Chantarasombat, C., & Sirisuthi, C. (2022). Using the Development Module of Leader Teacher in Creative Thinking for Enhancing the Doctor of Philosophy in Educational Administration and Leadership Program. *Multicultural Education, 7*(11), 67-80.

Chantarasombat, C., & Sombatsakulkit, E. (2021). Doctoral Program Learning Module on Developing Leading Secondary School Teachers in Creative Thinking for the Enhancement of Students' Learning Activities in Thailand. *International Journal of Higher Education, 10*(3), 138-149.

Chantarasombat, C., & Udombunyanupab, N. (2017). *Set of Learning 6: Supervising for Excellence*. Maha Sarakham: The Institute of Research and Development of the Community and Learning Management, Faculty of Education, Mahasarakham University.

Chantarasombat, C., &, Boriboon, P. (2023). Developing innovation for achieving learning in educational institutes by applying the educational supervision clinic is advising and coaching Under the Office of Mahasarakham primary educatio service area 3. *International Journal of Multicultural Education, 25*(2), 1086-1101.

Chantarasombat, C., Kongpet, Y., & Buntornwon, T. (2022). Developing Innovation for Achieving Learning in Educational Institutes by Applying Educational Supervision Clinique in Advising and Coaching. *International Journal of Special Education, 37*(2), 17065-17080.

Chantarasombat, C., Udombunyanupab, N., & Kenchaiyawong, N. (2018). The Development Program of Teachers by Increasing the Learning Achievement of Northeastern University, Office of the Basic Education Commission. *Educational Research, 12*(2), 54-69.

Chantarasombat, C., Udombunyanupab, N., & Songsri, C. (2018). The Development Program of Teachers by Increasing the Learning Achievement of Educational Places, Nakhon Phanom Office of the Basic Education Commission. *Educational Research, 12*(2), 18-35.

Colangelo, Nicholas, & Gary. (1991). A. Davis. *Creativity: The Creative Person*. Boston: Allyn and Bacon.

Crongtaneun, P. (2016). *Developing of a Math Module in Ordering*. Master of Science, Major in Teaching Mathematics, Chiang Mai University.

Deanery, W. (2016). *Developing Doctors to Deliver (3D)*. Annual Report, /2015-2016. Cardiff University.

Dechakup, P. (2011). *Teaching and Learning on Child Center: Teaching Concepts and Techniques*. Bangkok: Academic Quality Development Institute.

Desara, W. (1997). *Curriculum and Teaching Development*. Bangkok: Suriwiyasas.

Donbundit, P. (2008). Development *of a Chemistry Module for University Level by Cycle of Innovation*. Doctor of Education. Bangkok: Srinakharinwirot University.

Donphraipan, S. (2013). *The Program of Creative Learning Management for Secondary* School *Teachers*. Master of Science, Major in Agricultural Education, Faculty of Industrial Education, King Mongkut's Institute of Technology Ladkrabang.

Education Quality Development and Standard Group. (2009*). The Summary of Quality Auditing. (2010)*. Bangkok: Office of the Basic Education Commission.

Glenn M. (1994). *A Programmed Instruction Module for Cardiac Patients Taking Nitroglycerin.* No. 933116: DAI-A 62/05.

Groborz, M., & Necka, E. (2003). Creative and Cognitive Control: Explorations of Generation and Evaluation Skill. *Creativity Research Journal, 14*(1), 55-67.

Houle, Cyril. *The Design of Education*. San Francisco: Jossey-Bass Publishers, 1996.

Inruangsri, S. (2011). *Developing Thai Lives and Culture Module for the Vocational Students at Automotive Industry Technician College*. Master of Education. Ayutthaya: Phranakhon Si Ayutthaya Rajabhat University.

Institutions of Community Colleges. (2018). *Strategies of the Institutions of Community Colleges 20 Years (2018-2037).* Bangkok: Institutions of Community Colleges.

Kammanee, T. (2013). *Teaching Skills: Knowledge of Learning Management*. Bangkok: Chulalongkorn University Press.

Knowles, M. (1980). *Modern Practice of Adult Education*. New York: Cambridge, The Adult Education Company.

Kongtiang, S., & Photong, A. (1999). *Satisfaction Theories*. Bangkok: Dumronchai Printing.

Kulchorn, C. (1993). *Document of Curriculum Development*. Bangkok: Patumwan Demonstration School Srinakharinwirot University.

Lawrence, Gordon. (1973). Florida: *Modules on Generic Teacher Competencies: Module on Modules.* Florida The University of Florida.

Lubart, T. I., & Georgsdottir, A. (2004). *Creativity: Developmental and Cross-Cultural Issues. Creativity: When East Meets West*. World Scientific Publishing Co Pte Ltd. Nelson.

Norlander, T. (2000-2001). Conceptual Convergence in Creativity: Incubation and brain disease state. *Creativity Research Journal, 13*(3/4), 329-333.

Panich, V. (2013). *Teachers for Learners in the Classroom*. Bangkok: The Siam   Commercial Foundation.

Pattiyatanee, S. (2008). *Educational Assessment*. Kalasin: Prasan Printing.

Prahmawong, C. (1994). *Teaching Set Measurement*: Teaching Material for Technology and Educational Communication Units 1-5. Bangkok: Sukhothaithammathirat University.

Pukdeewut, S. (2013). *Creative Thinking Development Program for Learning Activity Management of Secondary School Teachers*. Doctoral of Education. Maha Sarakham: Mahasarakham University.

Pukdeewut, S., Chantarasombat, C., & Satapornwong, P. (2013). Creative Thinking Development Program for Learning Activity Management of Secondary School Teachers. *International Education Studies, 6*(12), 82-94.

Pumepaung, P. (2019). *Innovative School Quality*. Wattana Kraprao School, Office of the Basic Education Commission in Rayong 2, Rayong.

Ragnabtook, W. (1999). *Lesson Plan for Child Center*. Bangkok: LT Press Limited.

Rowland, Sidney. (1995). *The Development and Implementation of an Instructional Module that Prepares Pre-service Teacher to Address the Needs of Students with Attention*. Deficit Hyperactivity Disorder (ADHD). No. 536494: DAI-A 62/05

Sawyer, K. R. (2006). *Explaining Creativity*. The Science of Human Innovation. Oxford University Press.

Sikabundit, S., & Sikabundit, S. (2001). *Module*. Bangkok: Srinakharinwirot University.

Srisa-ard, B. (2003). *Teaching Development*. Bangkok: Foundation of Kids Loving.

Srisa-ard, B. (2005). *Basic Research*. Bangkok: Suriyasas.

Suda, S. (2005). *Developing an Industrial Control System for applying sensor equipment or a Diploma in Electrical Technology at Saraburi Technical College*. Master of Industrial Education, Major in Electricity. The King Mongkut's University of Technology Thonburi.

Sugkarn, H. (2000). *Developing the Program of Working During Learning to Enhance Morality in the Office of Graduate Students*. Doctor of Education, Chulalongkorn University.

Wasee, P. (2020). *Creating a New Attitude*. Retrieved from https://www.bangkokbiznews.com/news/detail/879432