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DEVELOPING A TRAINING CURRICULUM USING PROFESSIONAL LEARNING COMMUNITY FOR ENHANCING TEACHERS' LEARNING MANAGEMENT SKILLS TO PROMOTE STUDENTS' CREATIVITY AND INNOVATION ABILITY: A CASE STUDY OF THAI TEACHERS

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Abstract. Thai primary school teachers must be developed learning management skills for promoting students' creativity and innovation ability. This study developed a training curriculum to enhance teachers' learning management skills to promote students' creativity and innovation ability from using the professional learning community method and a training cycle "plan", "do", "check", and "reflect". There consisted three units of training curriculum, and the analytic scoring rubrics were used for collecting data. The results were (1) teachers' learning management skills were higher after implementing the curriculum at a statistical significance level of .01, and (2) students' creativity and innovation ability was higher after implementing the curriculum at the statistical significance level of .01.

Keywords: creativity, innovation, learning management, training curriculum.

Introduction

Nowadays, all students should have several skills for their future occupations, for example higher–order thinking skills, learning skills, and life skills. Creativity and innovation skills (CISs) are also the important skills for students because it is the foundation of every career in the future (Partnership for 21st Century Skills, 2009). Creativity and innovation are an ability to generate new ideas and participate with others in developing an innovation (Partnership for 21st Century Skills, 2009).

There are three components of the students' creativity and innovation ability (CIA) (Anderson & Krathwohl, 2000; Australian Government: Department of Education, Employment and Workplace Relations, 2009; Guilford, 1988; Partnership for 21st Century Skills, 2009; Torrance, 1977; Williams, 1969). The first component is creative thinking, which comprises

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five abilities: initiating thinking, using various methods of thinking, generating ideas from information, sharing ideas with others effectively, and evaluating and improving ideas. The second component is creative work with others, which comprises six abilities: communicating with others effectively, accepting the opinions of others, respecting others' ideas, putting initiatives into operation and adapting to the context, working with others collaboratively, sharing ideas and experiences with others. The third component is successfully developing an innovation, which comprises four abilities: planning for developing an innovation, developing the innovation, evaluating the quality of innovations, and improving the defects of innovations.

Although the CIA is an important ability for students in the 21st century, but Thai students in primary schools have to be developed the CIA because the evaluation results about it indicated that the average of Thai students' CIA have not been improving for several years (Officium et Educationi Elementariae Prodest Commission, 2016).

Enhancing students' CIA should be integrated into teachers' daily learning management through creative pedagogy (Lin, 2011). The creative pedagogy consists of creative teaching, creative learning, and teaching for creativity (Lin, 2011). Learning management should apply the learner centric approach, and provide learning activities appropriate to the nature of students through learning design effectively (Partnership for 21st Century Skills, 2009).

Effective learning design involves encouraging students to generate their own knowledge and understanding. The teachers should conduct learning activities according to the learner-centered approach (Dishke Hondzel, 2013). Furthermore, the teacher should create a learning atmosphere that stimulates students' thinking and provides sufficient support resources (Adams, 2005). Finally, the teachers should apply authentic assessment approach consist of using assessment tools and provide immediate feedback in their classroom to promote students' learning (McGinn, 2007).

In Thailand's educational context, Thai teachers, especially in primary and secondary schools, must be developed learning management skills to promote students' CIA. Accordingly, developing teachers' learning management skills for enhancing students' CIA is an urgent task (Officium et Educationi Elementariae Prodest Commission, 2016). There are various approaches to promoting the effectiveness of teachers' learning management. For example, 1) academic training, 2) self-development, 3) operate a professional learning community (PLC) in school, 4) morale building, and 5) formal learning courses. Moreover, the effectiveness of teacher development should promote teachers' content knowledge and learning management skills.

In the past decade, there was no literature on training curriculum to enhance teachers' learning management skills for promoting students' CIA by integrated the concept of PLC. However, previous research shown that the development of teachers to be competent in learning management that enhances the innovative skills of learners should develop systematically through training course according to Kaplan (2019) found that using a training program to promote teachers and future teachers to apply theories of creativity in instructional design can develop students' creativity. In addition, teaching methods of the teachers are also important to influence students' creativity as the research results of Narayanan (2017)

found that creative and innovative teaching methods makes a particular concept clear to the students as Toheri et al. (2020), also Hammershøj (2021), Rosen et al. (2020) identified that teaching models that can improve critical thinking, skills collaborate, communicate, and creative thinking are needed in the 21st century education era. Additionally, the research results of Conradty and Bogner (2020) found that teachers need to train in new ways of Science, Technology, Engineering, the Arts and Mathematics (STEAM) teaching for enhancing students' creativity and create science innovation. From the foregoing, it can be seen that the development of innovative skills of students is imperative to develop teachers to be able to manage learning through effective training curriculum according to Conradty et al. (2020), also Ritter et al. (2020), Kupers et al. (2018) recognized that many current curricula, in going beyond traditional goals, increasingly foster creativity that a core skill of the 21st century. As the literature review above, the researcher used it as the basis for formulating ideas and methods for teacher development in this study.

For this study, the researcher developed a training curriculum for enhancing teachers' learning management skills for promoting students' CIA by integrated the concept of PLC and a training cycle "plan", "do", "check", and "reflect" because training curriculum is a systematic designing for teacher development. The researcher applied the concept of PLC to designing a training curriculum. The concept of PLC is a professional development method that focused on developing professional skills through sharing working experiences. The researcher applied PLC principles into training activities: sharing values and visions of learning management; constructing a collaborative working culture among teachers; focusing on students' CIA during learning management; supporting academic leadership to teachers; and sharing learning management experiences with teachers according to practical guidelines established by prior research (Bolam et al., 2005; Caine & Nummela Caine, 2000; DuFour, 2004; DuFour et al., 2006; Feger et al., 2008; Seashore Louis & Kruse, 1995; Mitchell & Sackney, 2006; Reichstetter, 2006; Thompson et al., 2004). Moreover, the training curriculum in this study focus on authentic practice, sharing experiences, and learning together.

For training curriculum development process, literature review shown that research and development (R&D) is the research methodology for curriculum development that combines two approaches such as 1) research and 2) development for create some innovative curriculum and learning. The nature of R&D is systematic and relevance between research activities and development activities we call "the cycle of R&D". In many professions, R&D was used for developing some innovation. In general, the process of R&D composed of 4 steps, the 1st is context analyzing (R1), the 2nd is designing the innovation (D1), the 3rd is implementing the innovation (R2), and the 4th is evaluating the effectiveness of innovation (D2) (Regalis Societatis Officium, 2018; k12education.gatesfoundation.org, 2019). His Majesty King Bhumibol Adulyadej used the R&D methodology for developing many royal projects and all of Royal Development Study Center (Thailand) that very useful and important wisdom of Thailand and the world also R&D model of Bhumibol is the systematic cycle of "plan", "do", "check", and "reflect". The "plan" is analyzing information that relevance the projects such as statistical data, expert opinion, theoretical knowledge, research finding, and stakeholder opinion. The "do" is implementing the projects suitable

many contexts such as human culture, belief, economics. The "check" is assessment and evaluating the effectiveness of projects by using empirical data, statistical data, and expert opinion. The "reflect" is considering the evaluate results and improving the projects better (Regalis Societatis Officium, 2018). R&D in curriculum and instruction field have 4 steps the 1st is analyzing foundation data for designing innovation (R1), the 2nd is designing the innovation (D1), the 3rd is implementing the innovation (R2), and the 4th is evaluating and improving the innovation (D2). The core activities of research and development in curriculum and instruction, compose of 7 activities the 1st is analyzing foundation data, the 2nd is designing curriculum and instructional innovation, the 3rd is checking the quality of curriculum and instruction innovation, the 4th is implementing curriculum and instructional innovation, the 5th is evaluating the effectiveness of innovation, the 6th is improving to complete innovation, and the 7th is disseminating the innovation according to Gall et al. (2004), Institute of Education Sciences and National Science Foundation (2013). For this study, the researcher developed a training curriculum by 4 steps of R&D methodology such as the 1st step: information analysis before design a training curriculum, the 2nd step: design of the training curriculum, the 3rd step: implementation of the training curriculum, and the 4th step: evaluation of the training curriculum's effectiveness with the research objectives were 1) to evaluate teachers' learning management skills for enhancing students' CIA before and after implementing the training curriculum, and 2) to evaluate students' CIA before and after implementing the training curriculum. The overall population was primary teachers in Suphan Buri Province (SBP) (Thailand), under the Office of Basic Education Commission, Ministry of Education (Thailand) which is a total of 4225 people. Of these, 69 were selected by stratified random sampling. In addition, 243 students were selected from the same region. Teachers and students were told of the aims of the research, and all gave their consent to participate. The treatment variable was the implementation of a training curriculum, and the dependent variables were teachers' learning management skills for promoting students' CIA, and students' CIA.

1. Conceptual framework

For developing a training curriculum following the 1st research objectives, the researcher applied principles of PLC (sharing values and visions of learning management; constructing a collaborative working culture among teachers; focusing on students' CIA during learning management; supporting academic leadership to teachers; and sharing learning management experiences) to designing a training curriculum.

To evaluate the effectiveness of training curriculum following the 2nd research objectives, the researcher implemented a training curriculum with the teachers in primary schools and expected that teachers' learning management skills for promoting students' CIA, and also the students' CIA increase. As mentioned above, the conceptual framework for this study is depicted in Figure 1.

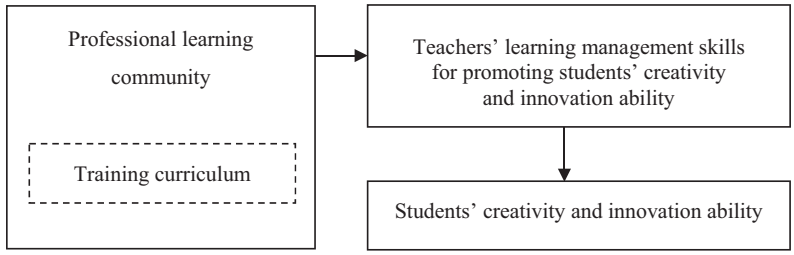

Figure 1. Conceptual framework (source: created by author)

2. Research methodology and results

Research methodology of this study was R&D by 4 steps such as the 1st step: information analysis before design a training curriculum, the 2nd step: design of the training curriculum, the 3rd step: implementation of the training curriculum, and the 4th step: evaluation of the training curriculum's effectiveness. The details of each steps were following.

2.1. The 1st step: information analysis before design a training curriculum

This step conducted by quantitative methods. The researcher studied teachers' opinions toward learning management skills for promoting students' CIA, and training styles that they wanted to participate in. This step was carried out in October 2017, and the detail was as follows.

First, teachers' opinions toward learning management skills needed to promote students' CIA were studied. Teachers were given a questionnaire with responses measured on a five-level of rating scale composed the questions about their learning management skills and students' CIA, also structure interviews about their opinion toward their learning management skills with them were also conducted. The results found that teachers preferred to be trained about learning management for enhancing students' CIA at a high level (mean = 4.23, standard deviation (SD) = 0.89, full score = 5). In addition, the teachers preferred to develop their learning management skills according to on the job training approach because they can apply knowledge and skills for enhancing students' CIA in the classroom effectively. Second, training styles for promoting teachers' learning management skills for enhancing students' CIA were studied. Educational experts were interviewed about training methods that appropriate for the teachers concerned. The results found that the training curriculum should integrate both of the concept of PLC and on the job training. Furthermore, it should provide academic resources for teachers that they can apply in the classroom effectively. After that, the researcher brought the results in this step to design a training curriculum in the 2nd step.

2.2. The 2nd step: design of the training curriculum

This step conducted by qualitative and quantitative methods. The training curriculum was designed from October – December 2017, as follows.

Initially, the first draft of the training curriculum was produced by the author. It comprised six elements: principles of training, the purpose of training, the content of training, training activities, training media, measurement and evaluation.

Following this, the first draft training curriculum was validated, through experts' evaluations of its consistency, suitability, and feasibility of implementation. The results found that: the consistency was a high level (mean = 4.39, SD = 0.49, full score = 5); the suitability was high level (mean = 4.49, SD = 0.50, full score = 5); and the feasibility of implementation was high level (mean = 4.48, SD = 0.51, full score = 5). Subsequently, the researcher revised the training curriculum and produced a second draft.

Finally, a pilot study of the training curriculum was carried out by the author with 12 teachers exceptional the teachers who were the sample. The results found that teachers' learning management skills for promoting students' CIA was increased after implementing the training curriculum at a statistical significance level of .01. In addition, students' CIA was increased after implementing the training curriculum at the statistical significance level of 01. Following this, the researcher revised the training curriculum again, and produced a third draft, final version for implementation in the main study. The final training curriculum comprised the following three units.

The first unit focused on introducing the concept of learning management for enhancing students' CIA. Training activities were consisted of an informal lecture, a workshop seminar on learning design for enhancing students' CIA, authentic assessment methods for enhance students' CIA, creative feedback for enhancing students' CIA, and sharing experiences between the researchers and teachers.

The second unit focused on integrating the concept of learning management for enhancing students' CIA, following the training cycle "plan", "do", "check", "reflect" and applied it to the classroom using the concept of work integrated training. Training activities consisted of a workshop seminar about how to stimulate and promote students' creativity, work integrated practice, and sharing experiences between the researchers and teachers.

The third unit focused on reflective thinking, analysis of lessons learned, and sharing experiences. Training activities consisted of reflective practice, discussion of lessons learned, and drawing conclusions relevant to learning management for promoting students' CIA. The results of this part were following the 1st research objectives.

2.3. The 3rd step: implementation of the training curriculum

This step conducted by quantitative methods. The training curriculum was implemented with 69 teachers and 243 students from January 2018 – July 2019. The teachers and students were selected by multistage sampling. The first step was selecting one of Thailand's region from four regions by simple random sampling. The selection result was the central region. The second step was selecting a province of the central region by simple random sampling. The selection result was SBP. The third step was selecting schools in SBP. The selection result was six primary schools consisted of 69 teachers with 25–59 years old, 24 male and 45 females, graduated with a bachelor's and master's degree in teaching. They wanted to improve their teaching skills and develop students' creative innovation skills because they knew the

importance of teaching quality that impact to the students' achievement and 243 students with 11–12 years old in grade 5 and grade 6 in countryside primary schools.

Two analytic scoring rubrics were developed for assess teachers' learning management skills and students' creative and innovation ability. The analytic scoring rubrics for assessing teachers' learning management skills consisted of 10 items. Each item was five full score. There were 1) stimulate thoughts and imagination of students, 2) stimulate students to think for better, 3) encourage students to use their learning potential, 4) provide opportunity to think and imagine for students, 5) encourage students to investigate and experiment, 6) create a learning atmosphere that is challenging students' potential, 7) use digital technology to support students' creativity, 8) boost students to use digital technology to create innovation, 9) assess learning and thinking for improvement, and 10) provide creative feedback to students. Each item was evaluated by 5 experts in a measurement discipline by item objective congruence index. The item objective congruence index of all items was 1.00, and alpha reliability coefficient was 0.93.

For the analytic scoring rubrics for assessing students' creative and innovation ability consisted of 15 items in 3 dimensions. Each item was five full score. The first dimension was thinking creatively. There were 5 items in this dimension following 1) think with originality and useful, 2) think to problem solving with various methods, 3) make decisions based on information, 4) plan for working systematically, and 5) think differently and lead to better things. The second dimension was working with the others creatively. There were 5 items in this dimension following 1) having good interaction with other people, 2) collaborate with other people to work, 3) accountability for working, 4) listen to other people's opinions, and 5) sharing experiences with others. Finally, the third dimension was creating innovation. There were 5 items in this dimension following 1) plan to develop innovation systematically, 2) develop innovation according to the plan, 3) assess the quality of innovation scientifically, 4) improve innovation based on information, and 5) disseminate innovation with other people. Each item was evaluated by 5 experts in a measurement discipline by item objective congruence index. The item objective congruence index of all items was 0.80–1.00, and alpha reliability coefficient was 0.91.

For experimental design, the researcher used the one group pretest–posttest design for implementing a training curriculum because the researcher wanted to study the increasing of teachers' learning management skills and students' CIA before and after implementing a training curriculum. Also pretest and posttest scores did not content count toward students' course grade. In this study, all of the students completed both tests were included in the data set. Two aspects were mentioned as the criteria of curriculum effectiveness. The first one was teachers' learning management skills for promoting students' creative and innovation ability after implementing a training curriculum was higher than before implementing a training curriculum. The second one was students' creative and innovation ability after implementing a training curriculum was higher than before implementing a training curriculum.

Training activities consisted of three units. The first unit was preparing teaching skills for enhancing creative and innovation. The duration of this unit was 6 hours. The second unit was applying skills to the classroom. The duration of this unit was 4 months following the training cycle: "plan", "do", "check", and "reflect", each cycle was 1 month. "Plan" was designing

learning activities for enhance creative and innovation ability. "Do" was teaching following the learning design. "Check" was learning assessment for improving students' creative and innovation ability. "Reflect" was after action review for improving teaching quality. Finally, the third unit was sharing experiences and conclusion. Duration of the third unit was 6 hours. As mentioned above, training activities for this study is depicted in Figure 2 below.

The "plan", "do", "check", and "reflect" cycle was integrated to teacher development through PLC activities in 3 cycles. Each cycle the researcher has developed teachers to be able to learning management to develop students' CISs suitable to the context of each class. In "plan" step, training activities focus on the concepts of student analysis and learning design. In "do" step, training activities focus on the concepts of instructional coaching, student motivation, and classroom management. In "check" step, training activities focus on the concepts of formative assessment and constructive feedback. In "reflect" step, training activities focus on the concepts of self-reflection, sharing and teaching improvement. There were 3 cycles indicated by Figure 3.

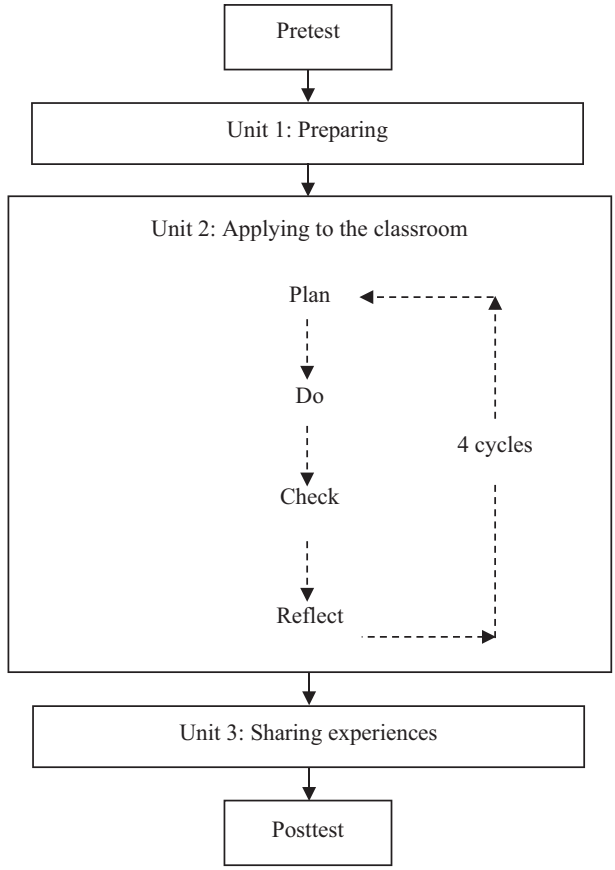

Figure 2. The training cycle in training curriculum (source: created by author)

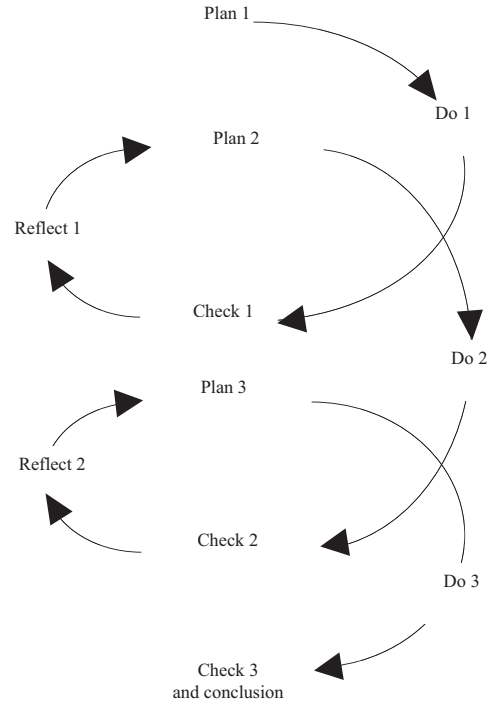

Figure 3. The "plan", "do", "check", "reflect" cycle (source: created by author)

The researcher control of extraneous variable during implementing a training curriculum, especially other training except this study by implementing a training curriculum during the semester. At this time, the teacher worked in school without other training. For the students, the researcher control of extraneous variable during implementing a training curriculum, especially the factor of other teachers except 69 teachers who were the sample by designing class time that students learned with the teachers who were the sample only. The results of implementing the training curriculum were as follows. For implementing the training curriculum following the training cycle "plan", "do", "check", and "reflect" for four rounds, which one cycle per one month, the findings of teachers' learning management skills to promote students' CIA, as shown in Table 1.

As mentioned in Table 1 above the results found that teachers' learning management skills to promote students' CIA in each training cycle were increased.

Table 1. Teachers' learning management skills to promote students' creativity and innovation ability in each training cycle (source: created by author)

Data collection	1st cycle (n = 69)	2nd cycle (n = 69)	3rd cycle (n = 69)	4th cycle (n = 69)
Mean	34.19	36.10	38.80	41.26
Standard deviation	1.77	1.61	1.56	1.52

For students' CIA, during implementing the training curriculum following the training cycle "plan", "do", "check", and "reflect" for four rounds, which one cycle per one month, the findings of students' CIA, as shown in Table 2.

Table 2. Students' creativity and innovation ability in each training cycle (source: created by author)

Data collection	1st cycle (n = 243)	2nd cycle (n = 243)	3rd cycle (n = 243)	4th cycle (n = 243)
Mean	49.42	52.13	55.04	58.25
Standard deviation	2.25	2.16	2.07	2.88

As mentioned in Table 2 above the results found that students' CIA in each training cycle were increased.

For comparing teachers' learning management skills for promoting students' CIA before and after implementing the training curriculum found that teachers' learning management skills increased after implementing the training curriculum, at a statistically significant, as shown in Table 3.

Table 3. Teachers' learning management skills for enhancing students' creativity and innovation ability before and after implementing the training curriculum (n = 69, full score = 50) (source: created by author)

Data collection	Mean	Standard deviation	Interpret	t	df	Sig. (1-tailed)
Before training	33.83	1.88	high	31.25	68	.01
After training	43.61	1.59	very high			

For comparing students' CIA before and after implementing the training curriculum found that students' CIA increased after implementing the training curriculum, at a statistically significant, as shown in Table 4.

Table 4. Students' creativity and innovation ability before and after implementing the training curriculum (n = 243, full score = 75) (source: created by author)

Data collection	Mean	Standard deviation	Interpret	t	df	Sig. (1-tailed)
Before training	46.43	2.35	moderate	50.57	242	.01
After training	59.17	2.88	high			

In addition, some qualitative data during implementing the training curriculum indicated that the students' who were the samples created several innovations. For example, they created the "sour mushrooms". The "sour mushrooms" is a kind of food innovation that the students created it for solving a local problem. The problem was too much fresh mushrooms in their community and rotten before cooking. Then the students created "sour mushrooms" from fresh mushroom following teachers guided. The "sour mushrooms" that the students created is a popular food in the current. Creating the sour mushrooms shown following the Figure 4.


Figure 4. Students created sour mushrooms (source: created by author)

2.4. The 4th step: evaluation of the training curriculum's effectiveness

This step conducted by quantitative methods. After analyzing the data as mentioned in 3rd step, the researcher evaluated the training curriculum's effectiveness according to two criteria. The 1st was teachers' learning management skills for promoting students' CIA after implementing the training curriculum higher than before implementing the training curriculum at the statistical significance level of .01, and the 2nd was students' CIA after implementing the training curriculum higher than before implementing the training curriculum at the statistical significance level of .01. The evaluation results, as shown in Table 5 below.

Table 5. The result of evaluation of the training curriculum's effectiveness (source: created by author)

No.	Effectiveness criteria	Results	Conclusion
1	Teachers' learning management skills for promoting students' CIA after implementing the training curriculum higher than before implementing the training curriculum at the statistical significance level of .01	Teachers' learning management skills for promoting students' CIA after implementing the training curriculum were higher than before implementing the training curriculum at the .01 statistical significance.	Criteria met
2	Students' CIA after implementing the training curriculum higher than before implementing the training curriculum at the statistical significance level of .01.	Students' CIA after implementing the training curriculum were higher than before implementing the training curriculum at the .01 statistical significance.	Criteria met

As mentioned in the Table 5, a training curriculum that the author develops met the effectiveness criteria. It indicated that the training curriculum has the effectiveness, according to the 2nd research objectives.

Discussions

For the training curriculum development by using PLC, the research finding showed that the training curriculum consisted of three units of training activities. This finding indicated that developing teachers' learning management skills for promoting students' CIA should operate

in a systematic form preparing stage, applying stage, and sharing stage according to research results by Kaplan (2019) involves the study of creativity in education, specifically through the training of teachers and future teachers to apply theories of creativity in instructional design. Teacher Education students were exposed to creativity theory and conditioned to apply theory in developing learner creativity in lesson and project design. Creativity theories were included in an online course in cognition and critical thinking in education as foundational psychological frameworks to apply in educational practice and in the design of creative activity in the course. The results found that the course was successful in cultivating creativity in educational design. The course developed participant thinking about creativity and participant designs. Participants understood and applied theory in a range of creative designs intended to support creativity. This is an important finding from this study. Furthermore, the research finding about this provides the evidence that teacher development in learning management for enhancing students' CIA should design systematically and step by step development. In addition, the researcher found that the training curriculum consisted of three training units for promotes teachers' learning management skills. The first unit focused on preparing teaching skills for promoting students' CIA. This implies that preparing the teaching skills of the teachers before they apply in the classroom is an important for supporting the teachers' understanding that how to promote students' CIA.

For this study, the researcher prepared teaching skills for the teachers who were the sample through workshop seminar. The workshop seminar consisted of three aspects. There were students' learning style analysis, learning design for promoting students' CIA, and assessment for improving students' CIA. The processes of the workshop seminar were designed suitable for teachers and useful for applying to the classroom. This evidence implies that teacher development in learning management to promoting students' CIA should prepare some sub skills through workshop seminar before applying to the classroom because the preparation assistances the teachers to have a clear concept of learning management to promoting students' CIA. In addition, the teachers got the guidelines book for developing students' CIA in after the workshop seminar. The guideline book consisted of the principles and example of teaching and assessment tools for promoting students' CIA. The teacher applied the examples of learning activities and assessment tools in their classroom variously for example, using an "innovation creativity" process for promoting students' CIA. This evidence implies that providing some teaching guideline was a supporting method that help the teachers learn about learning management to enhance students' CIA more.

The second unit focused on applying teaching skills to the classroom following the training cycle. The training cycle was "plan", "do", "check", and "reflect", based on PLC. This training cycle was the major of research findings because the teachers got the teaching skills for enhancing students' CIA through real situations through the training cycle. This evidence implies that teacher development should be developed following the training cycles. This study provides a new one of the training cycles named "plan", "do", "check", and "reflect". The teachers who were research sample learned about learning design for promoting students' CIA in the **"plan"** step.

In addition, the teachers learned about learning management to promoting students' CIA in the **"do"** step. In this step, the resources were provided for the teachers for example, teaching materials, learning media.

For the **"check"** step, training activity focused on developing the teachers in assessment for improving students' CIA. The training curriculum provided some examples of assessment tools that the teachers can apply to the classroom. In addition, the examples of assessment tools supported the teachers to using assessment for promoting the students effectively.

Finally, in the **"reflect"** step, training curriculum provided several opportunities of sharing experiences among the teachers. In this step, the teachers learned together through sharing experiences about teaching techniques and problem-solving in the classrooms. After that, the teachers applied to the second cycle of training cycle. This evidence implied that the training cycle in this study has important implications for the future design of teacher development for learning management for enhancing students' CIA.

For the first research objectives, the research results showed that teachers' learning management skills for promoting students' CIA was increased after implementing the training curriculum at a statistically significance. This evidence implies that teacher development for learning management to enhance students' CIA should provide systematically activities through PLC activities according to Mahgoub and Elyas (2014) found that the effective strategies for teacher development effected teachers' performance and students' achievement. In this study, the researcher provided three stages for developing learning management skills. "Preparing", "applying", and "sharing" stages were operated in training activities effectively that impact learning management skills of the teachers who were the sample. This finding can be contributed to designing other training curriculum for enhancing learning management skills in the future.

Additionally, training activities in this study were integrated the approach of PLC for supporting teachers' learning management skills. The teachers who were the research sample shared their practical knowledge with other teachers for promoting students' CIA during they participated in the training curriculum according to the research results by Conradty and Bogner (2020) found that a long-term professional development that is integrated into school life is an appropriate sociocultural sustainability entry to promote creativity in classrooms. Through creativity, apparently, students' self-efficacy increase. Integrating creativity into education via professional development works and provided a promising channel to multiplication into further classrooms. This is the strengthen of the training curriculum of this study, it has important implications for the future project of developing learning management skills.

Furthermore, PLC was a supporting system of the training curriculum. Teachers shared their ideas and experiences about learning management techniques that able to develop students' CIA through sharing experiences following a PLC's principle. In addition, PLC supported the teachers to develop their teaching performance through sharing experiences and leads to continuous improvement (DuFour, 2004; Feger et al., 2008; Hord, 1997; Protheroe, 2008; Stoll et al., 2006). This result indicated that developing teachers' in learning management for promoting students' CIA should apply the PLC to training activities.

For the second objective, the results of this study found that students' CIA was increased after implementing the training curriculum, at a statistical significance, it implied that the teachers applied their learning management skills that they received from training activities in the classroom for promoting students' CIA. Furthermore, this evidence shows that the teachers were conducted their learning management for promoting students' CIA following these principles: all students can learn by themselves through interaction with others and

the appropriate environment; learning is generated from the existing knowledge through assimilation and accommodation; interaction with society is a factor of promoting learning; and practice in real life will lead to meaningful learning, according to the suggestions of Sjøberg (2010), Giesen (2004), Good and Brophy (1994), Piaget (1929), Richardson (2003) and also previous research by Narayanan (2017) studies found that creative and innovative teaching methods makes a particular concept clear to the students, students develop interest to know exactly the concept, creates long lasting memory/correlation of a concept and there is positive relationship with creativity, innovation with student academic performance using various teaching methods. As well as the research results of Toheri et al. (2020) found that effective learning models can improve critical thinking, skills collaborate, communicate, and creative thinking of students also research results by Ibok (2020) found that teaching with learners' motivation effected to students' achievement and higher-order thinking.

In addition, this training curriculum supports the teachers to apply their knowledge that they received from training activities for learning management in the classroom that encouraged students' CISs according to research results by Ritter et al. (2020) found that creativity training increased students' ideation skills and, more importantly their cognitive flexibility. The teachers who were participants designed learning activities relevant to the nature of the students following the research results by Hammershøj (2021) found that learning activities relevance to students' interest through playing promoted students' imagination and creativity also Sjøberg (2010), Cooperstein and Kocevar-Weidinger (2004) suggested that learning activities with students' nature can promote students' CIA effectively. For example, the students created a procedure for reducing waste in their family. This implied that the teachers got the concept of learner-centric from this training curriculum and they can apply the concept to learning management in the classroom according to Conradty et al. (2020) developed STEM curriculum and found that current curricula, in going beyond traditional goals, increasingly foster creativity in science classrooms, declaring creativity a core skill of the 21st century and curriculum modules provided a social environment fostering students' CISs. This has important implications for the future design of training curriculum that should provide a practical section in real situations.

Furthermore, the teachers applied the concept of formative assessment that focus on using assessment for improving students' learning for developing students' CISs according to Rosen et al. (2020) found that formative assessments supported students' CISs. This implied that training curriculum for enhancing learning management skills should include formative assessment in training activities for encouraging the students' capacities, according to the suggestions of Battista (2012), Hodges (2007), Leighton and Gierl (2011), Scharmer (2016), Tan and Seng (2007).

Finally, the new finding of developing training curriculum for teacher development to enhancing student's CIA in Thailand educational context is the training cycle "plan", "do", "check", and "reflect". "Plan", "do", "check", and "reflect" cycle was a mechanism driving the process of developing teachers to be able to learning management for CIA. For "plan" step, it was to develop teachers to realize and understand learning management planning to develop learners. Effectively learning design supported teacher to more enhance students' CIA according to Sims (2006) identified that the design of the learning must be in harmony with the nature of the learner. Which will make the students learn better also Koper (2006) found

that the key principle in learning design is that it represents the learning activities and the support activities that are performed by different learners in the context of a unit of learning. The focus point of learning design was student analysis and lead to design learning activities. For "do" step, it was an opportunity for teachers to take action on real situation in the classroom which professional coaching and sharing experiences with others teachers who were the research participants according to Aglazor (2017) found that cooperating teachers was the successful factor of professional development in teacher education program. For "check" step, it was an important way for teachers to discern weaknesses and strengths in learning management. Teachers who can assess the quality of their teaching they can continuous improvement in teaching to develop students' CIA. Formative assessment was the important methods for access students' CIA and brought to improving teaching quality and more focus to promote students' CIA. For "reflect" step, it was a way for teachers to learn and develop their teaching skills. This research training course allows teachers to reflect and reflect on other teachers and to share their knowledge with each other and applied to improve their own teaching for develop students' CIA according to Kaldi and Pyrgiotakis (2009) found that "reflection" was a tool for continuously improves teaching quality. From this study, the research found that self-reflection was a factor supporting the change in teaching and learning behaviors that allows students to have CIA. The educational staff may apply the training cycle to developing teachers' skills for promoting students' CIA to other educational contexts with appropriate techniques.

Applying the results

The results of this research suggest the following practical outcomes:

1. Educational staff who want to develop teachers' learning management skills for promoting students' CIA should integrate all factors of creativity and innovation such as creative thinking, creative collaborative work, and successful development of innovations into a development program;
2. Effective implementation of a training curriculum should integrate the training activities into the learning management tasks of teachers. Teachers learn the concept of learning management through their daily work in schools;
3. Training supervision should apply the concept of mentoring and coaching in order to develop the teachers. Effective mentoring and coaching should be appropriate to the working culture of teachers. Mentoring and coaching is a support system of training activities;
4. It is important to apply the concept of authentic empowerment assessment for developing teachers' skills during implementation of the training curriculum. The training developers should reflect and provide feedback continuously.

Suggestions for further research

Future research should develop training curricula for enhancing other teaching skills appropriate to the 21st century, such as technological skills. Additionally, future research should develop training curricula for enhancing learner's CIA through community participation, because in this way the students will develop more ideas for creating innovations.

Conclusions

The results of this study found that the training curriculum consisted of three units of training activity. The majority of training process is the training cycle named "plan", "do", "check", and "reflect". In addition, the results of implementing training curriculum found that (1) teachers' learning management skills for promoting students' CIA after implementing a training curriculum was increased than before implementing at the statistical significance, and (2) students' CIA after implementing a training curriculum was increased than before implementing at the statistical significance.

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