Designing Learner-centered Instruction Practices Based on Transformative Learning through Critical Participatory Action Research

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The purpose of this critical participatory action research was to design the transformative learning activities from identifying "the shared felt concerns" of the student teachers. The participants include 13 student teachers, 6 pre-service student teachers, a lecturer, 2 mentors, and a technical expert; all voluntarily agreed to participate from a university located in the lower north of Thailand. The data was collected by various instruments (informal conversations, draft of plan, checklists, and field notes). The process of this study was to 1) establish "a public sphere", 2) ask the critical questions with the communicative action, 3) identify "shared felt concerns", and 4) design of the transformative learning activities. The results showed that there were 3 themes: first, fear of resistance towards teaching from students and a supervising teacher. Second, a lack of deep knowledge, experiences, and skills in the learner-centered approach, and third, student teachers were unconsciously passive learners. All themes led to design the activities for the 10 phases of the transformational process summarized as follows: starting with meditation, asking the critical questions, a metaphor for keeping a journal, round-robin discussion, group discussion, mind mapping, role play, building confidence and competence, and teaching in the actual classroom in the practicum experience. From these findings, it is recommended that establishing public sphere and communicative action through other activities or tools could support the participants' self-reflection and learning.

Keywords: shared felt concern, reconnaissance, public sphere, student teachers

For more than 10 years, the learner-centered instructive development in Thailand for the student teacher curriculum of the faculties of education has been supported by the Ministry of Education. However, the educational policy needs the faculties of education to foster student teachers to become the teachers as facilitator with learner-centered approach (LCA) (International Business Publications, 2008), including the pre-service student teachers who know the benefits of LCA and used to practice this technique in the classroom at their university. However, the previous research revealed that most of the pre-service student teachers have only adhered to teacher-centered teaching in the supervision process of teaching. The individual and structural factors effecting teacher-centered teaching include factors such as overloading the content in a curriculum, teaching overload, spending time for LCA, responding to student resistance, and a lack of deep knowledge and skills in LCA (Charoenchim & Chaowatthanakun, 2014; Jantarakantee, Faikhamta, & Rodrangka, 2012).

There is strong research evidence to support learner-centered instruction (LCI) instead of teacher-centered teaching. For example, LCI increased the students' motivation

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and satisfaction for learning and to gain greater achievement (Johnson, 1991; Maxwell, 1998; Slavin, 1990), the students developed confidence in their abilities, intrinsic motivation, and a desire for more learning (Alexander & Murphy, 2000), the learners who studied with active learning courses showed a significant improvement in their learning than those who studied in lecture courses (Springer, Stanne, & Donovan, 1999). These studies proved the advantages of LCA and that the pre-service student teachers should implement their practice.

The faculties of education in Thailand have differences of historical context and their arrangements in training student teachers programs. Thus, the consideration of problem solving in a particular area is an important aspect to make a direct change. The faculty of education, which is studied in this study, also required transforming the student teachers' teaching towards LCA. Specifically there was no research evidence or documentation to show problem solving teacher-centered teaching of the student teachers in a research setting.

A way of changing instructional practices for the student teachers in the particular area should be based on the methodology, which emphasizes the participation of the participants with the practices. This should also include other strategies like changing an individual's beliefs. Because most student teachers have been trained with the traditional teaching since they were young students in school, it is not a simple task to change their beliefs and behaviors towards the modern teaching methods of today. Thus, this qualitative study seeks to answer the questions: 1) What are the barriers, beliefs, or concerns of the student teachers towards learner-centered instruction?, and 2) How will the activities be designed to transform the student teachers' beliefs that were barriers of learner-centered instruction ? The purpose of the literature review in the next section is to present an overview of this entire research by integrating methodology and theories to create the research design and procedure to improve the student teachers' learner-centered teaching practices.

Literature Review

The worldwide trend is focusing on LCA not only in policy documents but also in terms of teachers' practices. UNESCO (2015) studied teachers and their teaching methods in seven countries in the Asia-Pacific region: Fiji, Indonesia, Japan, Kyrgyzstan, Nepal, the Republic of Korea and Viet Nam. These countries have moved from the traditional teacher-centered approach toward LCA. Even if many obstacles and conditions in those teachers' contexts existed, changing practices can take place in many diverse areas and through different activities for developing students learning capabilities. However, even though Thailand shifted the curriculum structure in 2001, and revised it in 2008 to LCA, the OECD/UNESCO team found that the teaching methods in most schools in Thailand are still lecture-based and rote learning to emphasize memorizing contents to promote students' grade-point average and the university entrance examinations, especially in the upper secondary schools (OECD/UNESCO, 2016; UNESCO, 2011). Some reasons for the conventional teaching in teachers are overloading their jobs or arranging other documental responsibilities,

which make teachers less satisfied with their jobs. Thus, teachers believe that lecture-based teaching is suitable choice for their limited time. Thailand's progress over time in The Programme for International Student Assessment (PISA) has not seen an increase in productivity and effectiveness in student learning while there has been a lack of progress in student performance. OECD/UNESCO (2016) suggested many recommendations such as reducing the workload, practicing with peer mentoring, focusing on updating teaching approach, establishing dialogue with teachers' connections to guarantee teachers' voices are heard, changing teachers' beliefs about teaching approach, and designing pre-service teacher training program rigorously.

In this research, we are aware of and focus on the possible problems in an effort to provide solutions, from both practical and theoretical knowledge, which can help instructors transform their teaching to LCA with more sustainability. From our review of literature about transforming educational or teaching practices, the transformative learning theory (TLT) can explain how individuals can transform their beliefs, and from this lead to a transformation of their behavior. Changing the individual behaviors that have been deeply affected by individuals' experiences in the past may have been aided by transforming their current frames of reference to new or adjusted frames of references. This is TLT by Mezirow (2012) in the field of adult education that underlines the transformation in the cognitive process. His TLT was derived from the literature of Freire (1970) and Habermas (1987), who were the primary movers for the theory's philosophy of change. Nowadays, TLT has been developing continually by these scholars to clearly explain how individuals have the capacity for transforming their assumptions and to adjust to their new roles, relations, and actions in life (Kear, 2014). In other words, this philosophy emphasizes changing individuals' beliefs or mindsets to bring new adapted beliefs which can lead to integrating new behaviors into an individuals' way of life. Mezirow (2000) explained the ten phases of transformational process of which three are integrally important: disorienting dilemmas, critical reflection, and changed meaning perspective. In each phase, there are various activities for practitioners and researchers in educational research. For example, the first phase of disorienting dilemmas may use the activities for triggering the dissonant beliefs such as asking a critical question (Brock, 2010) and thinking about and discussing critical incidents (Cranton, 2006). The critical reflection phase can work with this set of critical questioning: content, process, and premise reflection questions (Brookfield, 1987; Cranton, 2006), metaphoring (Gillis & Johnson, 2002), or dialogue (Taylor, 2009). The activities in the phase of changed meaning perspective such as conceptual mapping, role play, or think-aloud technique (Offredy, 2002). In this study, the phases of TLT's process play a core role for transforming the student teachers' belief in instruction from the traditional method to learner-centered teaching practices.

Many researchers have suggested that the participatory action research should be applied in research studying based on TLT (Kim & Merriam, 2011). Kemmis, McTaggart, and Nixon (2014) present that the methodology of the critical

participatory action research (CPAR) emphasizes "a practice-changing practice" with the involved and affected participant by their current practices which produce the kinds of untoward consequences that are reflected collectively in the "public sphere" through the critical questions. An early significant step of the CPAR is termed "the reconnaissance part". This phase is designed to explore and identify "the shared felt concern" of participants in the "public sphere" by using the critical questions to ask of their untoward consequences (something reflects to irrational or unreasonable, unproductive or unsustainable, and unjust and exclusion) from their past practices (such as cultural-discursive arrangements, material-economic arrangements, and social-political arrangements called Practice architectures) and their current practices (such as saying, doing, and relating called Practices) to collectively share their experiences with using the communicative action (this along with the inter-subjective agreement, mutual understanding, and unforced consensus). After "the reconnaissance part" is the spiral of development in action research: plan, enact, observe, reflect, and re-plan. We designed the procedure in this study with the process of the CPAR because of -1) there were the untoward consequences from the current practices of the Faculty of Education in preparing a pre-service student teacher and to examine their practices; 2) the way of solving problem should emerge from the critical conversation and questioning toward the practices with the student teachers, lecturers, staff, or the involved person with the communicative action, which is unforced consensus in their conversation; 3) we need to change their traditional practices through the new practices to better the rational, productive, and just practices by themselves together; and 4) it seems to collectively enable the concept of the CPAR and the TLT because both were effected by theorists in the critical theory as the philosophical roots of transformation such as Freire and Habermas (Kim & Merriam, 2011; Kitchenham, 2008) and focusing on transforming by the critical questions regarding the assumption. Hence, the CPAR was selected to be the methodology in this study due to the close relationship between the aim and aspects of the CPAR and this research problem and so "the reconnaissance part" is presented in this paper for identifying "shared felt concerns" in student teachers.

Additionally, the focus of this study is developing a critique of the TLT for supporting a change in the student teachers' teaching and expanding this theory into educational practices. Many scholars in the field of learning and education have criticized the TLT. The criticisms of TLT can be divided into two issues: 1) lack of relational learning: Mezirow did not investigate in detail how an individual gains learning from another person, while Taylor (1997) suggested that learning can take place through the relationship of people, including trust and supporting; and 2) omission of the emotional dimension: Mezirow believed that the cognitive process is the only important process that can transform an individual's frame of reference, while Taylor indicates that even if Mezirow identified that examining the negative feeling in the second phase of transformational process from 10 phases, there is no positive emotion to quantify. Thus, the positive emotion should be considered to be attached to this process (Taylor, 1997). Illeris (2004) presented that the transformation

in the adult can occur from learning through 3 dimensions: cognitive, emotional, and social dimensions, which is a contemporary and comprehensive theory of learning. This is a reason why it is essential to make an effort to review current literature to seek other concepts to assist to boost these critiques of the TLT to better aid this study.

The suggestions of the previous research and documents often recommended the concept of mentoring for reducing the critique about lack of relational learning (Frank, 2005; Harvie, 2004). So we selected the concept of mentoring from Daloz (2012) to insert in our procedure to push forward a change in the student teachers. Also, the broaden-and-build theory of positive emotions from Fredrickson (2013) for decreasing the weakness of omission of the emotional dimension in the TLT was used to carry forward their learner-centered instruction practices (Davidson et al, 2003; Wood, 2007). Due to this, we assume that integrating a part of the TLT and the methodology of CPAR by supporting the concept of mentoring and the broaden-and-build theory of positive emotions in the theoretical framework in this study may create the assumption that LCA will lead to the instruction practices of LCA in the student teachers.

Theoretical Framework

The last section of the literature review leads to the design of our theoretical framework. Here there is a change to a learner-centered instruction through Mezirow's process of transformative learning (TL) (Mezirow, 2012) in the student teachers with the CPAR of Kemmis, McTaggart et al. (2014) critical participatory action research, including building up the social dimension by Daloz's (2012) the concept of mentoring and the emotional dimension by Fredrickson's (2013) the broaden-and-build theory of positive emotions. This research study applied the entire methodology of CPAR into the 4 tentative parts in this research as shown in Figure 1.

Phase 1 reconnaissance step: following the first step of critical participatory action research, it is the reconnaissance step (Kemmis, McTaggart & Nixon, 2014) which explores and seeks voluntarily the participants in this phase (the student teachers, the pre-service student teachers, lecturer, and researcher) who are involved and effected the instruction practices of the student teachers, then to inform and establish the participants about the detail of public sphere. Next, the researcher asked the participants if the critical questions will help to explore their practices and practice architectures, and to identify their shared felt concern in their practices. This shared felt concerns were drawn to design as the activities plan which is based on the transformational process of the TLT by Mezirow (2012). Thus, the product of this reconnaissance phase was the activities plan which was planned by the expert of the TLT in practice, lecturer, mentor, and researcher, and to send to the student teachers for adaptation before using this plan in Phase 2. Moreover, asking the critical questions was a disorienting dilemma in the first phase in the TLT which was

scrutinized to trigger inevitably the student teachers' awareness in their untoward consequences from the Faculty of Education's the current practices. It seems to use with the critical participatory action research and the TLT.

For the Phase 2 activities step in transformative learning, the action plan was run with three phases of the process of transformative learning by Mezirow (2012): disorienting dilemmas, critical reflection, and changed meaning perspective that team facilitators (such as the expert of the TLT in practices, mentor, and researcher) lead the student teachers to follow the activities with the spiral of development in the action research (plan, enact, observe, reflect, and re-plan). The student teachers were observed on how they accomplish and reflect in changing of each the transformational process. If they cannot relate their reflecting for changing, team facilitators will re-plan the activities and to start it again with the new or adapted activities. Additionally, we increased building up the concept of mentoring and the broaden-and-build theory of positive emotions in this phase.

In the Phase 3 instructional practices step, the student teachers become pre-service student teachers because this phase is similar to the pre-service student teaching practicum experience in schools. They taught the students in school with learner-centered approach and their styles that the supervising teachers, students and themselves must reflect and evaluate how the pre-service student teachers did their learner-centered instruction practices. Also, the spiral of development in the action research was used in this phase to re-plan their practices to better rational in saying, productive and sustainable in doing, and just and inclusive in relating.

Finally, the phase 4 knowledge synthesis step was that all participants cooperated to discuss about each step and evidence (subjective and objective, individual and collective) from all the processes in this research by using a kind of synthesis method to synthesis knowledge from learner-centered instruction practices through activities based on TLT and the methodology of CPAR as shown in Figure1.

The relevant concepts and theories for designing the activities of TL for this paper were synthesized to explain that: 1) we used "the reconnaissance part" of CPAR help elicited the student teachers' concerns to create their disorienting dilemmas in Part 1 while the "public sphere" was covered the atmosphere of "reconnaissance part"; 2) the ten phases of transformational process by Mezirow were summarized and compiled into three phases, which proceeded continuously from Phase 1 to Phase 2, and Phase 2 to Phase 3 by using Kolb's cycle of experiential learning to accomplish the objective of activities in each phase and to assure that change occurred in the student teachers; 3) learning by action followed by Kolb's cycle which shows that the action research can assist the process of TL in the student teachers; 4) the student teachers participated collectively in the activities, moreover we supported TLT, which has been previously criticized for a lack of positive emotions and learning from other relative sources, with mentors to support them about mathematical knowledge, teaching skills, and help in creating the positive emotion through all phases as follow in Figure 2.
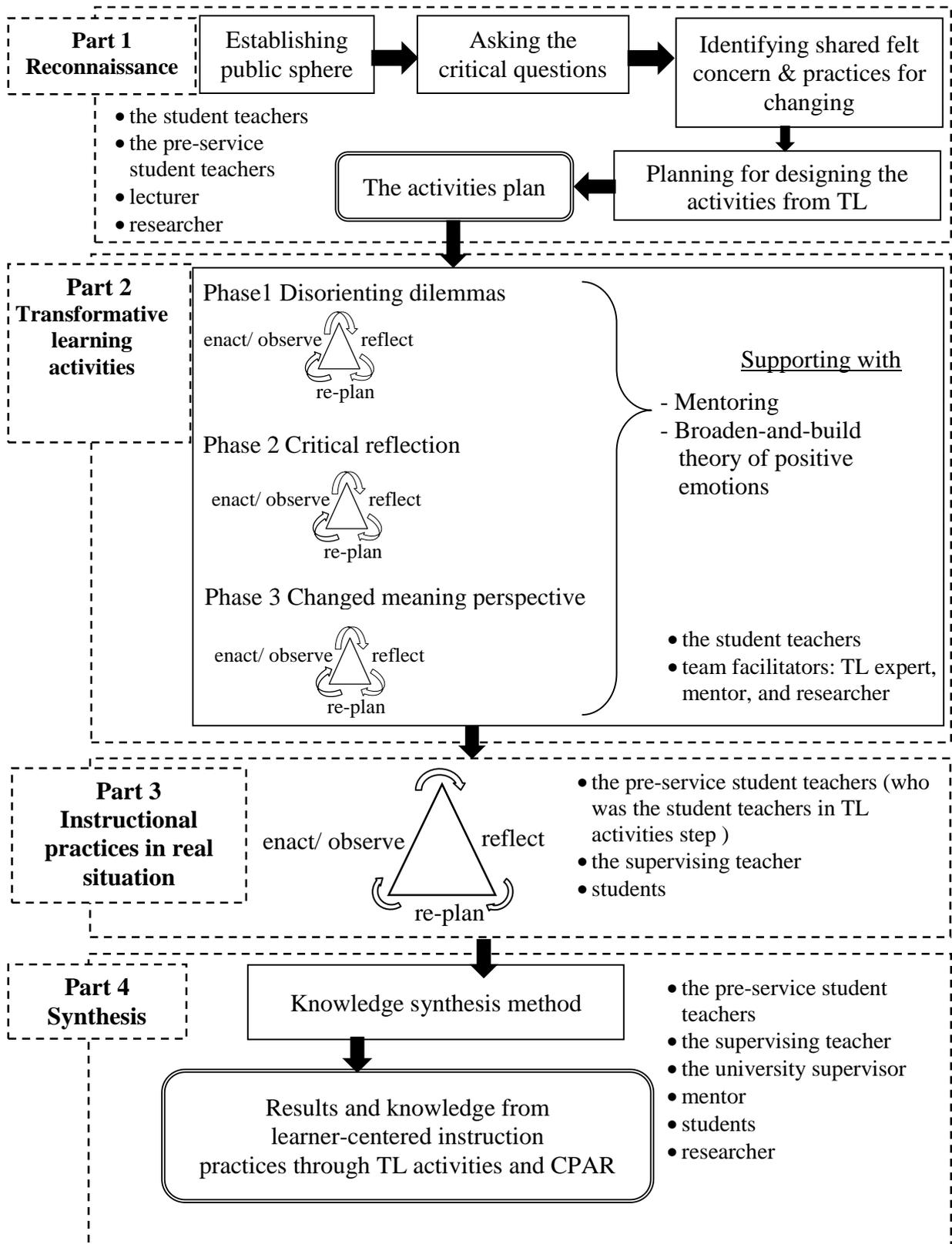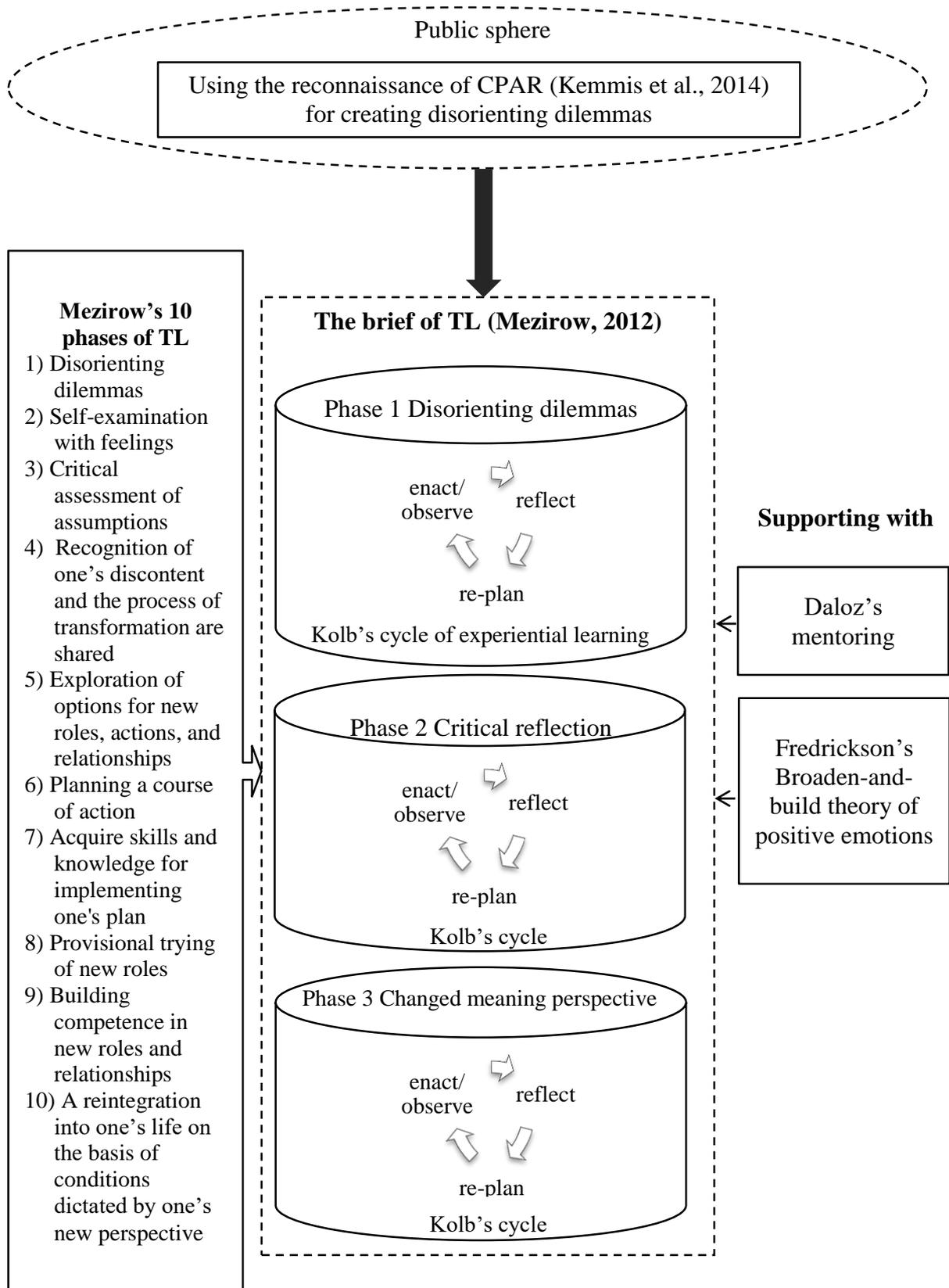
Part 1 Reconnaissance

Establishing public sphere → Asking the critical questions → Identifying shared felt concern & practices for changing

- the student teachers
- the pre-service student teachers
- lecturer
- researcher

The activities plan ← Planning for designing the activities from TL

Part 2 Transformative learning activities

Phase 1 Disorienting dilemmas

enact/ observe — reflect
re-plan

Phase 2 Critical reflection

enact/ observe — reflect
re-plan

Phase 3 Changed meaning perspective

enact/ observe — reflect
re-plan

Supporting with

- Mentoring
- Broaden-and-build theory of positive emotions

- the student teachers
- team facilitators: TL expert, mentor, and researcher

Part 3 Instructional practices in real situation

enact/ observe — reflect
re-plan

- the pre-service student teachers (who was the student teachers in TL activities step)
- the supervising teacher
- students

Part 4 Synthesis

Knowledge synthesis method

Results and knowledge from learner-centered instruction practices through TL activities and CPAR

- the pre-service student teachers
- the supervising teacher
- the university supervisor
- mentor
- students
- researcher

Figure 1. Theoretical Framework.

Public sphere

Using the reconnaissance of CPAR (Kemmis et al., 2014)
for creating disorienting dilemmas

Mezirow's 10 phases of TL

1) Disorienting dilemmas
2) Self-examination with feelings
3) Critical assessment of assumptions
4) Recognition of one's discontent and the process of transformation are shared
5) Exploration of options for new roles, actions, and relationships
6) Planning a course of action
7) Acquire skills and knowledge for implementing one's plan
8) Provisional trying of new roles
9) Building competence in new roles and relationships
10) A reintegration into one's life on the basis of conditions dictated by one's new perspective

The brief of TL (Mezirow, 2012)

Phase 1 Disorienting dilemmas

enact/observe   reflect

re-plan

Kolb's cycle of experiential learning

Phase 2 Critical reflection

enact/observe   reflect

re-plan

Kolb's cycle

Phase 3 Changed meaning perspective

enact/observe   reflect

re-plan

Kolb's cycle

Supporting with

Daloz's mentoring

Fredrickson's Broaden-and-build theory of positive emotions

Figure 2. Synthesis of Conceptual Framework for Designing the Activities in TL.

Method

The entire methodology in this research was based on the critical participatory action research (CPAR) by Kemmis et al. (2014) that was presented in the first part in this research paper with "the reconnaissance part" of this methodology used to explore and identify the "shared felt concerns" in the participants' practices to create the TL activities.

Public Spheres and Communicative Actions

The characteristic features of the CPAR as explained by Kemmis et al. (2014) were "public spheres" and "communicative actions" as follows:

1) Public spheres – It was interpreted from Kemmis et al. (2014) that the concept of public spheres in the critical participatory action research was effected and applied from Jürgen Habermas (1996) which served the definition of "participation" of the people to receive the legitimacy and validity of knowledge claims and to lead to the way of new practices which can help to expand the rational and reasonable saying, the productive and sustainable, and the just and inclusive relating to our society. The characteristic aspects of public spheres were checked with the ten important features of public spheres for the critical participatory action research clarified by Kemmis et al. (2014) like in Table 1. From Table 1, it was considered that all features appeared in this research, except for the last feature which was "Public spheres are often associated with social movements" because of this was not assured whether the participation of participants in this research was equivalent to the power of social movement.

2) Communicative actions – it was related with the public sphere that the theory of communicative action by Habermas (1987) was explained and effected to Kemmis and McTaggart (2005) and Kemmis et al. (2014). The communicative actions were applied to all participants, who were informed about these 3 aspects of actions in the communication among people and try to reach: 1) intersubjective agreement; 2) mutual understanding; and 3) unforced consensus.

Participants

This step was conducted in the Faculty of Education in a university located in the lower north of Thailand and many university teachers and staff provided practice and instruction to assist prepare the student teachers to become a lifelong learning teacher with learner-centered approach (Department of Education, 2016).

The methodology of CPAR explains that a researcher should recognize the people who are involved and affected by their practices and the diversity of participants in an institutional setting might help to get different point of views, including to voluntarily participate in the research (Kemmis et al., 2014). In this study, the aim was to endeavor to involve people that had incurred problems of student teachers' teaching in the Faculty of Education in the university located in the lower north of Thailand. They were asked to participate in this research, and we found that thirteen mathematics

student teachers, each in their fourth-year, who will be a pre-service student teacher in their fifth-year in preparation for professional experience in the school were willing to participate. In addition to the six mathematics pre-service student teachers, their instructors, mentors, and an expert of the TLT willingly agreed to participate in this research.

Procedures

The 'reconnaissance step' of critical participatory action research is the highlight for this study. After the participants agreed to participate in this research and to accept the features of public spheres and communicative actions, we interpreted and applied the procedure described in Kemmis et al. (2014) to conduct this step as follows Figure 1. In this study, evidence was collected for the duration of December, 2014 to February, 2015. Meetings in all steps were held eight times and for around 60-150 minutes per time with the different participants in each step like Table 2 (not all participants were involved in every meeting.) The four steps of the reconnaissance in this study were:

First step: Establishing "public sphere" in CPAR based on ten characteristics by Kemmis et al. (2014). Basically, we introduced ourselves and carefully presented our research to different participants, and allowed the opportunity for asking questions. Next, we informed the participants about ethical agreements necessary for participation in "public spheres" and the features of communicative action and then asked the questions again so we could ensure understanding as to accepting this agreement.

Second step: Critical questions were asked helping to explore different participants' shared felt concern. The questions focused on the current and past practices of their faculty and lecturers about their untoward consequences about irrational saying, unproductive and unsustainable doing, and unjust and exclusive relating to sharing and reflecting their experiences in public spheres with the communicative action. The examples of questions: "How many subjects did you study about mathematics instruction?", "What did you do in these subjects?", "Are you satisfied with it? Why?", "Did you study with the learner-centered instructors? How?", "How the instructors teach you about the learner-centered approach?" etc. In addition, it was important to explore their disorienting dilemma by asking about their beliefs or assumptions which could act as a barrier of changing to the learner-centered instruction. Because the student teachers and the pre-service student teachers need to clearly answer the questions it was decided to separate the student teachers and lecturers and to conduct the interviews outside of their office.

Third step: Identifying the shared felt concerns & practices for the participants, and to consider their shared felt concerns which they can potentially develop usefully by themselves together for a change to the learner-centered instruction.

Fourth step: Planning for designing the transformative learning activities from the previous step by different participants to start in Phase 2. The expert, lecturer, mentors and researchers designed collectively the initial activities before presenting to the student teachers to conclude and revise this action plan.

Evidence and Documenting

Gathering evidence and documenting in this study also followed Kemmis et al. (2014) that suggested that collecting many various types of evidence can help a researcher to triangulate the evidence from many sources and types which include Informal conversations (photographs & audio recording), Journals, Document analysis, Draft of plan, Checklists, Sample work samples, and Field notes. Moreover, these are connected to the research perspectives in critical participatory action research, which are based on the individual-social dimension and the objective-subjective dimension.

Analysis

From the step of asking the critical questions to each participant, they shared their experiences of practices in the Faculty of Education with their document and evidence that all informal conversations were transcribed and analyzed with a coding system to research what participants were concerned about being a pre-service student teacher with the learner-centered instruction to take these concerns or disorienting dilemmas to design the activities plan of transformative learning in Phase 2. Their felt concerns resulted from the past and current practices of their lecturers and Faculty of Education, which were the untoward consequences in saying, doing, and relating. Consequently, the emergent codes were used for the student teachers' shared felt concerns, which were suggested by the expert of transformative learning. And the priori codes were listed with the practices and the practices architectures analysis table by Kemmis et al. (2014: 81): saying, cultural-discursive arrangements, doing, material-economic arrangements, relating, and social-political arrangements.

Findings

According to our analysis of the evidence it was found that the student teachers' "shared felt concern" in being a pre-service student teacher with the LCA had 3 themes which emerged from the evidence.

1. Fear of resistance towards teaching.

Student teachers could collectively reflect how they are concern about resistance from their students and supervising teacher in their school in the next semester. Because of this student teachers believe that their students will possibly become familiar with the traditional teaching style, and may not accept their learner-centered teaching style, and this can lead to many kinds of resistance from students. Thereby, feeling disappointed with their teaching and moving back to the traditional instruction can undoubtedly happen in the real situation.

> *Actually, we believe in the LCA that can help the students improve their learning, but in our country, it is hard to change to transform because most students in schools used to study with their teachers who teach with the lectured-based and the students don't want to study by themselves.*

They wait their teachers to give knowledge to them. I fear that they may resist our teaching when using the LCA. (Tammy)

Furthermore, a felt concern of resisting the teaching method from their supervising teacher could be especially restricting in designing teaching styles.

From my experiences, I think it was not as bad as some early retired teachers in schools still stick to their traditional teaching, and try to convince us to teach like that. It should change otherwise the traditional teaching is not end. (Likert)

2. A lack of deep knowledge, experiences, and skills in the LCA.

This concern is directly related with the past and current practices of the people who are involved with designing their curriculum and teaching in the subjects, especially the subjects of teaching, and teaching mathematics in this Faculty of Education. Even though there are more than 3 subjects of teaching in their curriculum, but student teachers cannot completely explain and understand the essential characteristics of the learner-centered approach, including the ability to almost completely design their teaching as the traditional teaching. Another participant said "LCT is like a person who is my friend for only one day. It's not my close friend, and not an acquaintance like thing just come and gone" (Lilly).

It is interesting what happened to their practices of teaching LCA in this case. Student teachers jointly identified that their curriculum and instructors focused on knowing various teaching methods and techniques in theoretical concepts, but did not precisely emphasize the experiential learning of LCA in their practices:

- Integrating between the methods, techniques, and the content of Mathematics knowledge

  I am really disappointed with the subjects of Mathematics teaching such as Teaching in elementary school, secondary school, and high school education. These 3 subjects should expose the content in each level and to discuss how to teach this content or to divide into group for searching how to teach this concept. (Minus)

- Demonstrating the microteaching by individual adequately

  Another participant said "We all have to demonstrate our teaching with the role play around 10 minutes but the lecturer assigned us to design and write the lesson plan in 50 minutes." (Kanny).

- Evaluating student teachers' microteaching profitably

  Another participant said "And focusing on my using words in the lesson plan such as I should be not start the sentence with the word of

teacher. I think it was not the good way to evaluate my teaching."
(Phunky).

- Learning from the professional models critically

- observing teachers in schools considerately

3. Student teachers were unconsciously passive learners.

According to the critical questioning in "the reconnaissance part" in this study to trigger student teachers to explore their practices and practice architectures, basically we found that student teachers identified the cause of all problems within their faculty, lectures, and curriculum, but these factors could hardly change and spend too much time transforming its historical practices. After asking student teachers the critical questions, they critically reflect that changing at their individual mindsets and behaviors is simpler than other external factors such as their instructors, or their faculty's administration etc., and at last they will gradually attempt to improve their learner-centered teaching by themselves without waiting for the command from their lectures, faculty, systems or anything. Another participant said "The lecturers should integrate the contents and the methods together for applying in the real classroom" (Bazzin). Another one said "I used to ask the lecture, but he did not answer it. So, I did not want to ask him again" (Mozart).

Designing the Activities of TL for Changing Instruction Practices in Mathematics Student Teachers to LCA

The student teachers' "shared felt concerns" were identified and applied to the step of planning for designing the activities from TL that we presented in our conceptual framework. The participation of the expert of TL, mentors, the university teacher, researcher, and the student teachers tentatively designed the activities in Table 1. These TL' activities were designed and mixed with the student teachers' "shared felt concerns" to change their instruction practices to an LCA. The sequence and activities' aspects are based on the ten phases of transformative process by Mezirow (2012).

In Table 1, the activities of TL for changing the student teachers to learner-centered instruction was started by meditation around ten minutes to prepare the state of mind in participants to be emotionally tranquil before the activities which started as follows:

Phase 1: Disorienting dilemmas: This phase's purpose was to trigger the student teachers' confusion to have critical questions with their fears and the role of good pre-service student teachers that the student teachers' "shared felt concerns" came from the previous step.

Phase 2: Self-examination with feelings: using metaphors for self-examination about feelings both by way of positive and negative emotions, which were designed differently from the original TLT that emphasizes the negative emotion. Metaphors with the nature around people can help to know objectively the student teachers' feelings such as the sky, sea, weather, color etc. After that, the student teachers reflected collectively with a dialogue about their feelings.

Phase 3: Critical assessment of assumptions: The purpose was to discover or explore the student teachers' beliefs or assumptions by asking critical questions such as why the student teachers felt certain feelings. Why they had fear and are concerned about being pre-service student teacher with a LCA and what was the involved experience with their fears?

Phase 4: Recognition of one's discontent and the process of transformation are shared: The participants expressed their experiences and their transformative process with others by keeping a journal before and then using round-robin discussion or a circle of voices to share their new thoughts and new understanding.

Phase 5: Exploration of options for new roles, relationships, and actions.

Phase 6: Planning a course of action: Group discussion for exploring and planning the new practices of pre-service student teachers, and to present by writing or drawing the mind map.

Phase 7: Acquire knowledge and skills for implementing one's plan: The participants come together to search and learn actively by themselves about learner-centered teaching both its knowledge and skills.

Phase 8: Provisional trying of new roles: After the student teachers received the new skills and knowledge from LCA, they act through role playing as the mathematics pre-service student teacher with LCA.

Phase 9: Building competence /confidence in new roles and relationships: The mentors commented and made suggestions about their role play teaching, including building confidence and competence in the student teachers.

Phase 10: A reintegration into one's life on the basis of conditions dictated by one's new perspective: The aim of this phase was to identify if the student teachers could integrate the LCA into their teaching so that their teaching could proceed and develop gradually by themselves. Included within this stage were the suggestions of supervising teachers, mentors, and university supervisors. In this phase, the student teachers graduated to become pre-service student teachers. This is the practicum experience for the pre-service student teachers of Faculty of Education in Thailand. This step connected with Part 3 in this research.

Table 1

The activities of TL for changing to learner-centered instruction

Shared felt concerns	Phases of TL	Designed activities
Fears of resistance toward teaching from students and a supervising teacher within the classroom.	1) Disorienting dilemmas	Meditation around 10 minutes 1) Critical questions about the barriers of learner-centered teaching of the student teachers and the role of good pre-service student teachers
	2) Self-examination with feelings of fear, anger, guilt, or shame	2) Metaphors the student teachers' feelings both positive and negative emotions with the natures such as sky and reflection
	3) Critical assessment of assumptions	3) Critical questions about why the student teachers feel like that? , why they fear and concern about being pre-service student teacher with LCA? , what is their assumption, what was the involved experience with their fears?
	4) Recognition of one's discontent and the process of transformation are shared	4) Reflection by keeping a journal and round-robin discussion or circle of voices
Student teachers were unconsciously the passive learners	5) Exploration of options for new roles, relationships, and actions 6) Planning a course of action	5 + 6) Group discussion for exploring and planning the new practices of pre-service student teachers, and to present by mind mapping
A lack of deep knowledge, experiences, and skills in the LCA	7) Acquire knowledge and skills for implementing one's plan	7) Collaborative learning in lack of LCA's knowledge and skills and to learn actively by themselves
	8) Provisional trying of new roles	8) Role play the student teachers' teaching in LCA with mentors
	9) Building competence /confidence in new roles and relationships	9) Feedback and building confidence and competence in the student teachers by mentors
	10) A reintegration into one's life on the basis of conditions dictated by one's new perspective	10) Teaching in the real classroom in the practicum experience for the pre-service student teachers (as Part 3 in this research)

Discussion and Conclusion

This study was designed according to the activities of TLT (Mezirow, 2012) in order to change the instruction of student teachers toward LCA. All themes applied to practical usage in the various activities of transformative process in ten steps by the participants. In the designed activities, the facilitators created the state of positive emotions using the broaden-and-build theory of positive emotions by Fredrickson (2013) and guided the knowledge and skills to the student teachers following the concept of mentoring by Daloz (2012). Moreover, each step in this part concurrently employed the features of communicative action and "public spheres", which is emphasized by Kemmis et al. (2014). Besides, this study uses the methodology of CPAR, which mainly explores the participants' setting, so other settings possibly have the difference of "shared felt concern" in their setting. This feature is not a limitation in this research, but it is an aspect of this methodology to aim to change the practices of participants in a particular area, which is not to emphasize "the generalization" (Kemmis et al., 2014).

However, the benefits of this study can be discussed from various theoretical aspects and practice implications. Firstly, it appears that the relationship between the current practices and the arrangements in the past of the Faculty of Education have inevitably effected student teachers' mindsets and abilities in learner-centered teaching, especially from lectures and curriculums. The results from this study help the people who are involved in Faculty of Education to have insight in their past and current practices that they perhaps misunderstood for a long time to their practices in the beneficial ways to student teachers. Thus, shared felt concerns in the reconnaissance step can help to understand deeply in their practices, and lead to positive changes and developments. Even though, we cannot change directly the arrangements of structural administration in this study such as the curriculum or the role of lecturers in teaching based on learner-centered approach, but change should begin with student teachers, who are important participants in this study by asking the critical questions to explore and identify their concerns. Consequently, student teachers insight is critical in their historical practices and to re-think how to develop their teaching to deeply understand LCA by themselves without having to make changes in the macro system of the educational policy.

Secondly, it should be clear that this step of reconnaissance is very important for CPAR to initially start with the critical questions in the 'public sphere' and the communicative action to trigger and re-think about their untoward consequences from their current practices and arrangements in the past. Moreover, this step seems to be played simultaneously with the disorienting dilemma phase in the TLT by Mezirow (2012), because asking the critical questions about the practices in their study life can trigger them to have questions with their practices, and to share and reflect collectively before the examination of their negative and positive feelings, and their beliefs based on TLT. Hence, the reconnaissance step in CPAR and the disorienting dilemmas in TL are compatible in this research to help to answer student teachers' shared felt concerns in their practices, including designing the transformative plan and activities to change exactly in their new practices.

Thirdly, the activities or action plan of TLT for changing the student teachers' instruction was designed collectively from the participants and directly involved with the student teachers' teaching. In addition, the action plan was designed by mixing between the theoretical and practical of the TLT, the broaden-and-build theory of positive emotion, and mentoring. Then, this action plan had more rational, productive, and fairness with the student teachers and may lead to a change to their learner-centered instruction.

The suggestion from this study is that the researcher should consider how to create properly the "public sphere" in the setting or to provide the communicative tools and activities to support the participants such as dialogue. In addition, it is a challenge for researcher or scholars in the field of TL to develop with the expansion of the process of TL by "the reconnaissance" of CPAR for more accomplished in transforming practices.

The limitation of this study was that all participants could not participate completely in each step at the same time and place. Especially on the occasion when the student teachers required answering the critical question without their university teacher because of the student teachers believed that their negative expressions may have an effect on the university teacher. Thus, the researcher had to ask the critical questions privately with the university teacher after the student teachers' session.

Acknowledgments

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