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Developing reflective thinking instructional model for enhancing students' desirable learning outcomes

Satjatam Porntaweekul[1*], Sarintip Raksasataya[2] and Teerachai Nethanomsak[3]

[1,2,3]Department of Curriculum and Instruction, Faculty of Education, Khon Kaen University, Thailand.
[1,2,3]Mittrapab Road, Nai Muang Subdistrict, Muang District, Khon Kaen 40002, Thailand.

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This work aims to investigate the reflective thinking instructional model for enhancing empowerment of pre-service and in-service educational students in Roi-Et Rajabhat University, Thailand. In this research, qualitative methods, observation, interview, short note, and group discussion were used to indicate students' desirable learning outcomes, teaching and learning targets, social system relationships, indirect and direct specifications, performances, and specifications. Students' reflections are related to the social system and conceptualizations affecting students' activities. Persuasive thinking and experience reinforce the experimental exchanged report and reflections scales. Students' behaviours and recalling thinking of their experimentation toward their learning outcomes were found. Specification problems with their decision and belief positions on empirical data were satisfied. Students were able to select and presume the positions of the management existing evidence that solved their problems and developments. Students' skills and strategies of their reflective thinking involve increasing desirable outcomes purposeful and solving problems, formulating inferences, calculating likelihoods, and making decisions thoughtful and effectively in a particular context.

Key words: Development, instructional model, interview, observation, qualitative method, reflective thinking, empowerment, educational student, learning outcome.

INTRODUCTION

This paper gives a background of reflective thinking of teachers and students' instructional model. Qualitative method was used in this study. Education in Thailand is provided mainly by Thai Government through the Ministry of Education from pre-school to senior high school. A free education of twelve years is guaranteed by the constitution, and a minimum of nine years' school attendance is mandatory. Formal education consists of at least twelve years of basic education, and higher education. Basic education is divided into six years of elementary education and six years of secondary education, the latter being further divided into three years of lower- and upper-secondary levels. Kindergarten levels of pre-elementary education, also part of the basic education level, span 2–3 years depending on the locale, and are variably provided. Non-formal education is also supported by the state. Independent schools contribute significantly to the general education infrastructure.

*Corresponding author. E-mail: s_porntaweekul@yahoo.com, toansakul35@yahoo.com.au.

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Administration and control of public and private universities is carried out by the Office of Higher Education Commission, a department of the Ministry of Education. A teacher is a professional, which is admired by all; he develops people's economic and social daily life, and also provides education for students. The role of teacher is often formal and ongoing; it is carried out in school or other place of formal education. Teachers, like other professionals, may have to continue their education after they qualify; it is a process known as continuing professional development. Teachers may use a lesson plan to facilitate students' learning, provide a course of study, known as curriculum with particular knowledge or skills in the wider community setting.

One of the researchers of this work is an instructor at the higher education system, the Training Teacher College in Roi-Et Rajabhat University. The student-teachers have Bachelor degree; the senior student teachers must improve themselves to be able to trainee students who will teach in local basic school commission. The established Roi-Et Rajabhat University, the higher educational committee is under the jurisdiction of the Ministry of University Affairs in the government sector. It offers excellent programmes especially in the fields of education, arts, humanities, and information technology, although many students prefer to study law and business abroad or those local schools in Thailand. The researchers use the reflective thinking model for preparing teacher students who have desirable learning outcomes toward their teaching. Reflective thinking, that is, mentally-engaging in cognitive processes for understanding conflicting factors in a situation is a critical component of the learning process (Atkins and Murphy, 1993; Dewey, 1933; Moon, 1999; Schön, 1991). This mental engagement results in a person actively constructing knowledge about a situation in order to develop a strategy to proceed within that situation (Hmelo and Ferrari, 1997).

According to the Training Educational Teacher Commission in Roi-Et Rajabhat University, a teacher unlike an ordinary worker, acts as a master, crafts man, an artist, a strategist and a powerful motivator. Pre-service education is education of teachers before they enter into service as teachers. During this period of teacher education programmes, teaching practice goes side by side, while they are getting knowledge about theory papers. A good deal of improvement in the teacher education programme is needed. Pre-service education is carried out for preparing different types of teachers. Pre-service teacher preparation is a collection of unrelated courses and field experience. Research based curriculum development of pre-service teacher education is yet to take roots. These programmes are intended to support and enhance teachers' learning, inculcating in them a greater degree of self-confidence. The beginning teachers in this case learn from their practice and the culture and norms of the unique school settings wherein they are placed. It is important for teacher educators to learn how to get in touch with the core qualities of a good teacher and how they can stimulate these qualities in student teachers. This will lead to a deeper involvement in the learning process of teacher educators as well as student teachers. The inclusion of appropriate content knowledge about essential qualities of a good teacher in relevant theory papers and practice of effective domain related traits in school situation for a longer duration could help promote these traits in student teachers. The teacher education programme needs to allow the development of teachers' personality as people who are reflective, introspective and capable of analyzing their own life, so that they can be agent of change.

The moment a teacher has completed his training in a college of education in Rajabhat Roi-Et University, it does not mean that he is now trained for all times to come. A teaching degree, like B.Ed. makes him enter into service as a teacher. Thereafter his job continues well only if he continues his studies everyday in the classroom situations and outside the classroom; if he comes across problems he is expected to sort them out. There is need of more and more knowledge, more and more education for making him a better teacher. There are formal an informal programmes of in-service education organized from time to time. The higher authorities concerned with education want to ensure that the standards of education are properly maintained. That is possible only if the teachers refresh their knowledge and keep it up to the mark. The different agencies, therefore, keep on organizing teacher education programmes for enriching the knowledge of teachers and also for over all proficiency and betterment. In-service education is the education a teacher receives after he has entered the teaching profession and after receiving his education in a teacher's college. It includes all the programmes – educational, social and others in which the teacher takes a virtual part, all the extra education which he receives at different institutions and other professional courses.

Schön (1983), in his book titled, 'Historical background of development of reflective thinking', introduced concepts such as *reflection-on-action* and *reflection-in-action* which explain how professionals meet the challenges of their work with a kind of improvisation that is improved through practice. However, the concepts underlying reflective practice are much older. Earlier in the 20th century, John Dewey was among the first to

write about reflective practice with his exploration of experience, interaction and reflection. Soon thereafter, other researchers such as Kurt Lewin and Jean Piaget developed relevant theories of human learning and development. Some scholars have claimed to find precursors of reflective practice in ancient texts such as Buddhist teachings and meditations of Stoic philosopher Marcus Aurelius. Central to the development of reflective theory was interest in the integration of theory and practice, the cyclic pattern of experience and the conscious application of lessons learned from experience. Since the 1970s, there has been a growing literature and focus around experiential learning and the development and application of reflective practice. Boud et al. explained: "Reflection is an important human activity in which people recapture their experience, think about it, mull it over and evaluate it. It is this working with experience that is important in learning" (Wikipedia, the Free Encyclopedia, 2014).

For this exact reason, researchers were interested in developing the reflective thinking instructional model of student teachers, and to administer three steps of methodological research, namely; synthesis in texts, references, and reflective thinking, where building up of data related to the reflective thinking instructional model for student teachers' learning outcomes is the first step. The second step is to develop and synthesis various instructional methods, which have been recommended to support reflective thinking. Yet the nature of the underlying factors in these methods is unclear, such that exploratory factor analysis was used to determine the factors prompting reflective thinking for their thinking skills. The final step is to suggest that student teachers perceived three method clusters as supporting their reflection, namely:- reflective learning environments and reflective teaching methods- development of solving problem of students' satisfaction of their learning outcomes and relationships between students' development of their thinking processes and their attitude to their professional teacher. How can the methodology of this research develop the reflective think instructional model of teacher and teacher students?

Song et al. (2005) said that reflective thinking was important to young adolescents as they developed their thinking skills. Results of this study suggested that young students perceived three clusters of methods as supporting their reflection: reflective learning environments, reflective teaching methods, and reflective scaffolding tools. McBrien (2007) reported that reflective thinking can be an important tool in practice-based professional learning settings where people learn from their own professional experiences, rather than from formal learning or knowledge transfer. It may be the most important source of personal professional development and improvement. It is also an important way to bring together theory and practice. Choy and Oo (2012) reported reflective thinking instructional model in Malaysia and described that the concept of reflective thinking as a precursor for incorporating critical thinking has not been adequately researched. Most research has not given any effective strategies on how to incorporate these two concepts. There is a constant need to incorporate critical thinking into the classroom without much success. This study would be attempted to show a link between reflective thinking and its ability to stimulate critical thinking. Teachers often perceive that critical thinking skills need to be taught. The use of reflective thinking might be a precursor to stimulating critical thinking in teachers. The research questions were on the reflective thinking skills of teachers and how they perceived themselves and their teaching. This study showed that most of the teachers did not reflect deeply on their teaching practices. According to Boody (2008), teachers' reflection can generally be characterized as: retrospection, problem-solving, critical analysis and putting thoughts into action. For this review, we integrated the theoretical frameworks by Boody (2008), Hamilton (2005) and Schon (1987) and will discuss reflective thinking based on the following characteristics.

The importance of need assessment to assess teacher students' reflective thinking is developed from the findings of educators and researchers. This is because of the starting place in Dewey's philosophy and educational theory is the world of everyday life. Unlike many philosophers, Dewey did not search beyond the realm of ordinary experience to find some more fundamental and enduring reality. For Dewey, the everyday world of common experience was all the reality that man had access to or needed. Dewey was greatly impressed with the success of the physical sciences in solving practical problems and in explaining, predicting, and controlling man's environment. He considered the scientific mode of inquiry and the scientific systematization of human experience the highest attainment in the evolution of the mind of man, and this way of thinking and approaching the world became a major feature of his philosophy. In fact, he defined educational process as a "continual reorganization, reconstruction and transformation of experience" (Dewey, 1916: 50); for he believed that it is only through experience that man learns about the world and only by the use of his experience that man can maintain and better himself in the world. This thinking interested our teams.

Overall, critical reflection is the process of analyzing,

reconsidering and questioning experiences within a broad context of issues like ethical practices, learning theories and use of technologies. There are assumptions that individuals hold are subject to distortions and may limit their views of reality. Many ideas have highlighted that critical thinking is social in nature and requires reflection on the part of the learner. However, it must also be noted that how reflective teachers are toward their lessons would also influence students' critical thinking skills. As such, the current investigation focuses on the reflective practices of teachers in planning their lessons, the perceptions the teachers have of themselves, their students and their work. It attempts to study: the reflective practice of teachers and how it influences their teaching in supporting teacher students in their learning outcomes in Roi-Et Rajabhat University, Thailand.

Research aims

1. To develop a methodology for the reflective thinking instructional model to enhance both pre-service and in-service educational student teachers' reflective learning environments and teaching methods.
2. To enhance student teachers' desirable learning and teaching outcomes.

Research questions

This section analyzes uses the research questions on each phase of the research methodology; it focuses on developing the reflective thinking model.
1. What are the effects, procedures, and strategies to develop the reflective thinking of student teachers?
2. How are the designs of the reflective thinking used for enhancing student teachers' desirable learning outcomes?
3. Do the student teachers use the reflective thinking model in teaching their students in school?

RESEARCH FRAMEWORK

This study determined the development of reflective thinking model for enhancing teachers and student teachers' learning and teaching outcomes, the relationships between reflective thinking model and syntax teaching phase, associations between student teachers' learning and teaching outcomes and social system. Environmental responding principal of learning reaction, supporting system to enhance the teaching and learning designs that must be got to straighten learning and teaching goals and the application of using learning and teaching positions with the reflective thinking model were done.

The reflective thinking model from previous research studies was used to develop the reflective thinking of this work, using meta ethnography. Students' responsibility was described using the learning theory of David (1975). The *Kolb's reflective model* was highly influenced by earlier research conducted by John Dewey and Jean Piaget. Adapted version of the original reflective thinking from the single loop of learning of Chris and Dodald (1978) was examined. The structured reflection involved in Kolb's (2005) experiential learning cycle with Gibbs (1988) was discussed. A structured mode of reflection was designed that provides a practitioner with a guide to gain greater understanding of student teachers' practice, according to Johns (1995). Brookfield (1998) suggested that reflective practitioners should constantly research their assumptions by practice through four complementary ideas. However, this study follows completely Gary Rolfe's reflective model (2001) based on Terry Borton's 1970 developmental model. Finally, the concept of the *design cycle* describes the reflective and repetitive structure of design processes, with this structure underlying all such processes of Ganshirt (2007)

This study involves investigation, interview, and observation using both qualitative approach and the reflective thinking theories of the followings: Schon's theory, Rolfe's theory, Gibbs' theory, and Argyris' theory. A sample of lecturers and student teachers of Roi-Et Rajabhat University, Thailand was used.

METHODOLOGY

The focus on this research study was to analyze and arrange the aims of the research target in 3 phases (Table 1):

Firstly: To synthesis previous researches on developing reflective thinking and suggesting effects and strategy of student teachers' reflective thinking with the meta ethnography.
Secondly: To develop the teaching and learning of reflective thinking formats to the educational personnel who train student teachers with the Participatory Action Research.
Thirdly: To develop the reflective thinking model for supporting students doing internship in schools. The reflective thinking model was used to improve their attitude towards teaching and students' responsibilities in schools. Trainee students were assessed of their development using the reflective thinking model.

Sampling group

1. The research articles are composed of 30 manuscript using the Meta ethnography technique.

Table 1. Details for research procedure at the research phase.

Property	Procedure	Targets and goals
Research Question		To determine, process, and strategy to support thinking development of student teachers.
Purpose		Synthesis of previous researches of 30 titles that ought to indicate that the student teachers develop process of reflective thinking development
Methodology		To synthesis of the application on students' properties with the meta ethnography
Educational units	Sample	Reporting previous research in fields of reflective thinking
	Variable	Determinant, format, strategy of enhancing teacher students of their reflective thinking
Assessment	Assessing technique	Document analysis and recording paper note
	Research instruments	-Recording data of research property -Recording assessment of research quality
Evaluation	Methodological technique/statistic	-Frequency and percentage -Means and standard deviation
	Discussion	-Comparisons between variables -Investigation and conclusion

2. The Participatory Action Research technique was administered on the sample sizes of 126 student teachers in 5 subject educational programs, namely; Mathematics, Science, English, and Music educations, and 4 participating educational teachers in the Trainee Teacher College in Roi-Et Rajabhat University.
3. There are 4-experts in field of reflective thinking educators for improving learning and teaching designs.
4. The Case Study Research on the learning and teaching designs was done with a sample of 24- sophomore student teachers doing Science, English, and Mathematics programs.

Accumulating data

The following qualitative research instruments - observation, interview, group discussion, and post learning short note techniques were administered according to these procedural steps (Figure 2).

Step I: Synthesis data

The literature review, texts, documents, thesis reports, and relative research were synthesized to build up a model of the reflective thinking instructional model for teaching and learning in sample classes, and developing the learning skills of student teachers. Thereafter scaffolding tools such as interactive journals, question prompts, and concept maps also prompted reflective thinking, namely the *Teaching Model Dummy.*

Step II: Framework model

Researchers who prefer inquiry-oriented activities help students to reflect on a situation by asking thoughtful questions. Following Joyce and Weil (2010)'s suggestion, who present what is considered to be a classic model in the field, this work covers the rationale behind the major models of teaching, and applies these models using scenarios and examples of instructional materials. These models accelerate students' learning and act as lifelong learning tools with the major psychological and philosophical framework, namely Reflective Thinking Model for Teaching and Learning (Figure 3).

Step III: Experimental teaching

Normally, the *learning environment* might prompt students to construct meaning actively and reflectively. The *Framework Reflective Thinking Model for Teaching and Learning* was also used with an experimental group of 26 junior Mathematics student teachers in Roi-Et Rajabhat University in the first semester, 2011. Providing learner-controlled instruction encourages students to make their own decisions regarding their learning progress so as to improve the Reflective Thinking Model (Figure 4).

Step IV: Checking quality of model

Collaborative learning, in which students explore their understandings and misunderstandings together, helps students to think about what they already know, what they need to know, and how they would present and defend their own ideas in reaction to an instructional situation. Researchers presented this model for adaption, improvement, and advice by the related-senior professional educators who were able to check its validity according to the IOC (Index Of Concordance) for efficiency value. This step is

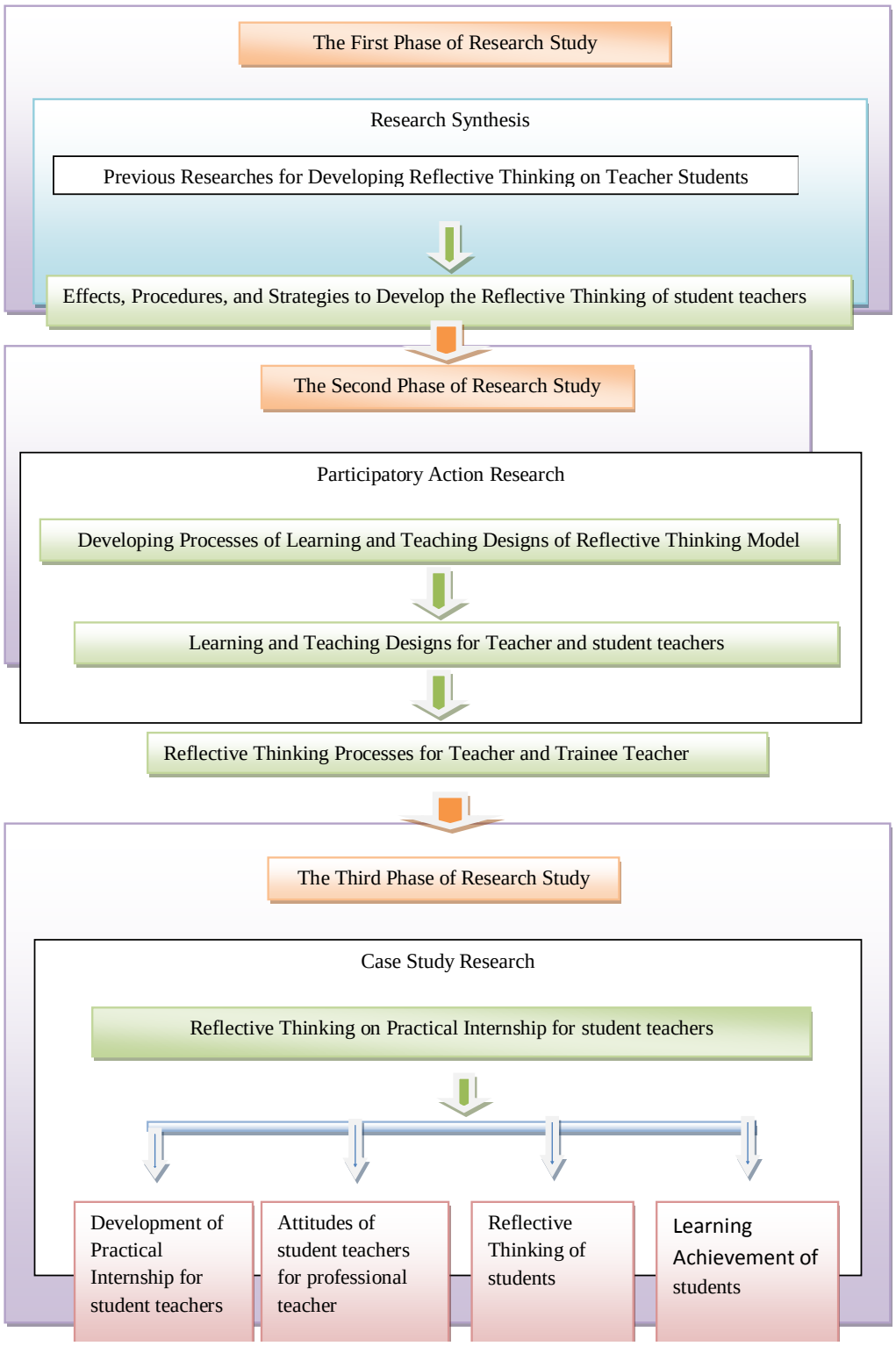

Figure 1. Reflective thinking model for developing learning and teaching designs of teacher students.

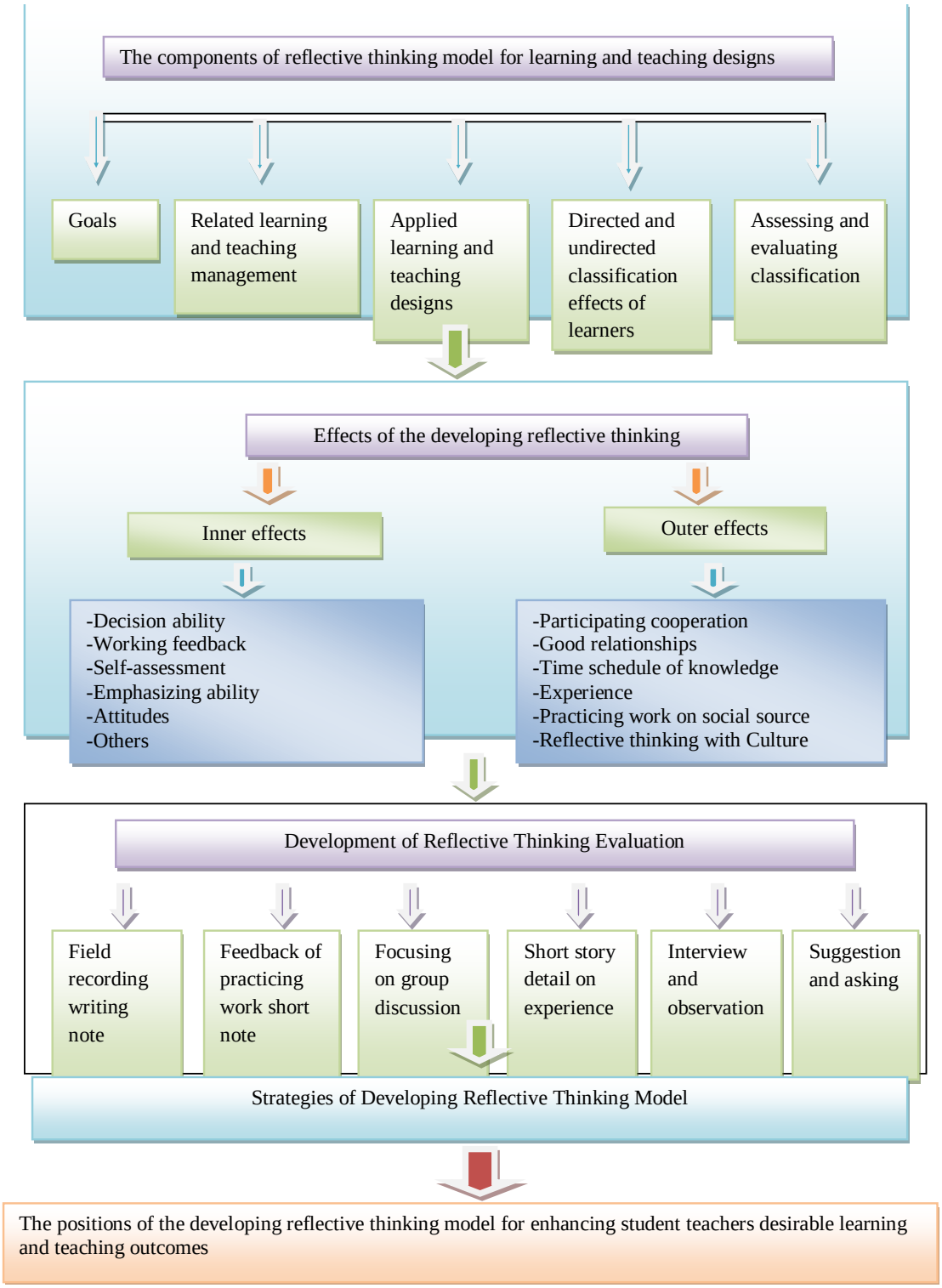

Figure 2. Model of developing reflective thinking model for enhancing teacher students of their self-minding desirable learning and teaching outcomes.

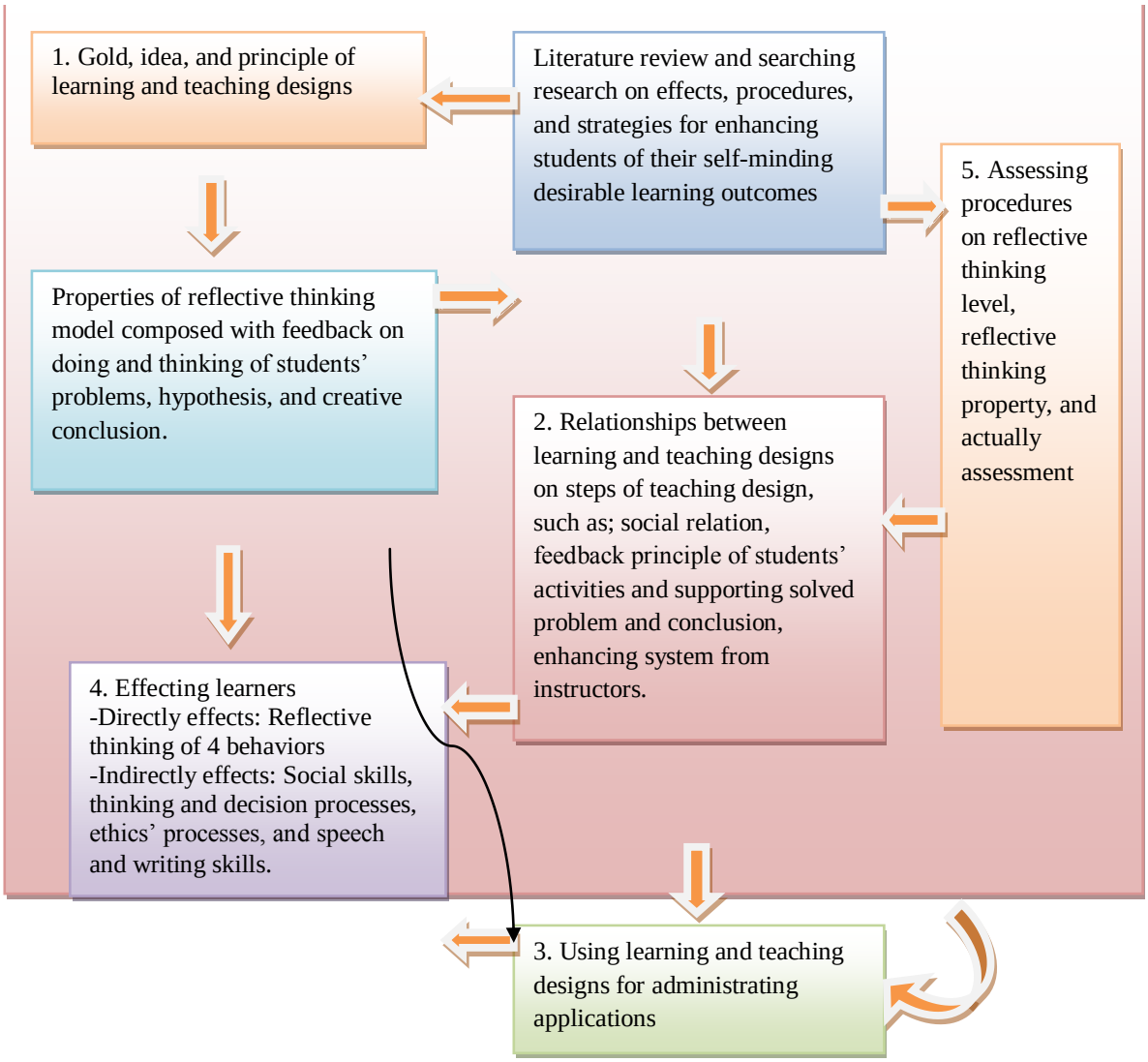

Figure 3. Framework reflective thinking model for teaching and learning.

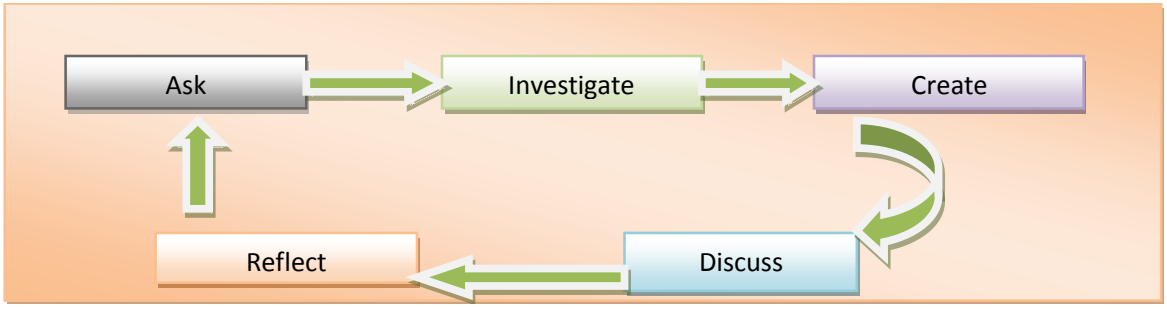

Figure 4. Reflective thinking model.

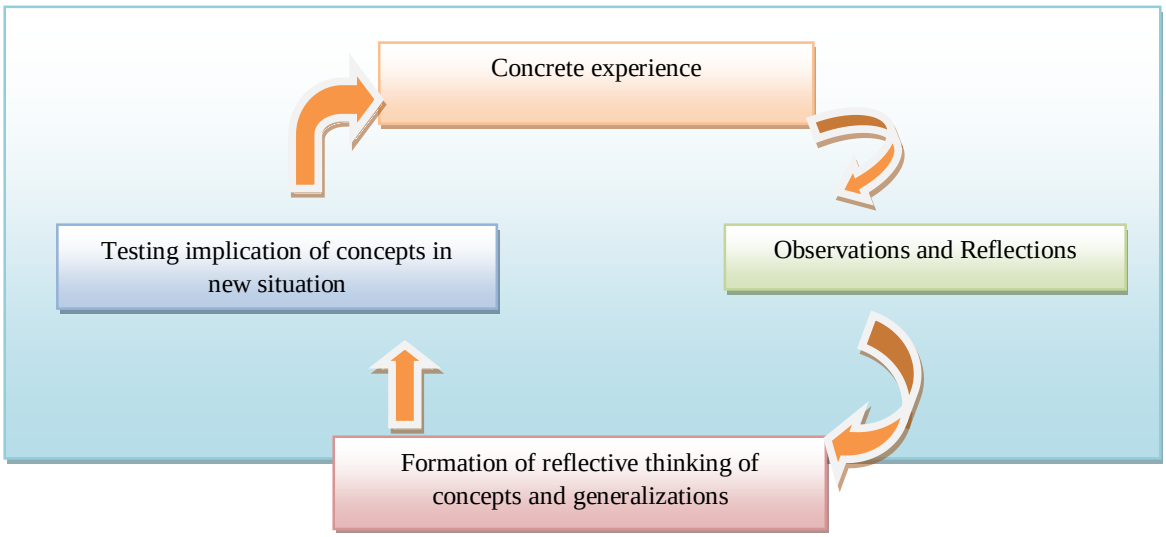

Figure 5. Improving quality reflective thinking model.

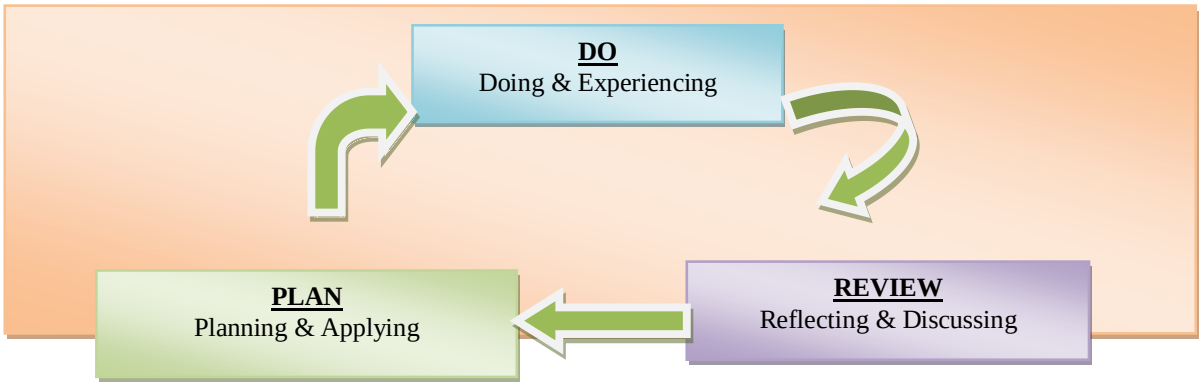

Figure 6. A quality reflective thinking model.

called the improving quality reflective thinking model (Figure 5).

Step V: Propagandized model

Complex learning activities requiring student teachers to learn from *A Quality Reflective Thinking Model* of information was adapted. Researchers taught this model to the four lecturers taking part in the participatory action research (Figure 6).

Step VI: Using model for teaching and learning processes

A further investigation on individual difference in student teachers' reflective skills is also needed, so as to discover which underlying factors are meaningful. Students may perceive the effectiveness of particular design factors differently according to their individual characteristics. A qualitative technique utilizing observation, interview, group discussion, and post learning short note techniques was developed by the researchers and used because no pre-existing instruments were available to measure the perceived helpfulness of factors prompting reflective thinking. The survey instrument was composed of carefully targeted question items, based on an extensive examination of the reflective-thinking literature, namely- Reflective Thinking Instructional Model (Figure 7).

Step VII: Conclusion

This study identified five design factors that a sample of student teachers perceived as helpful in prompting their reflective thinking.

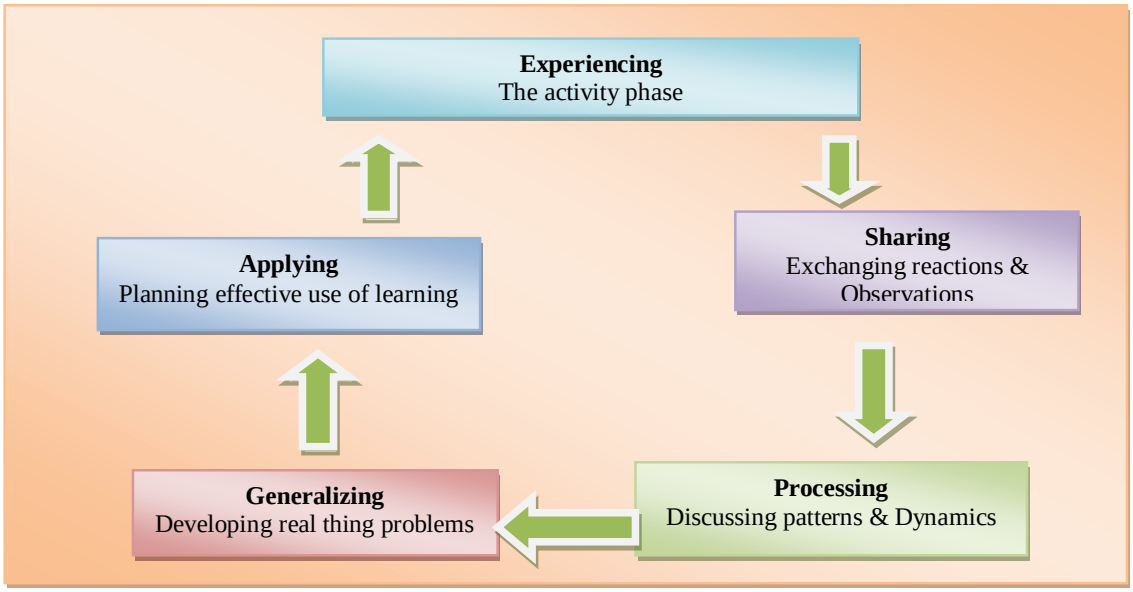

Figure 7. The reflective thinking instructional model.

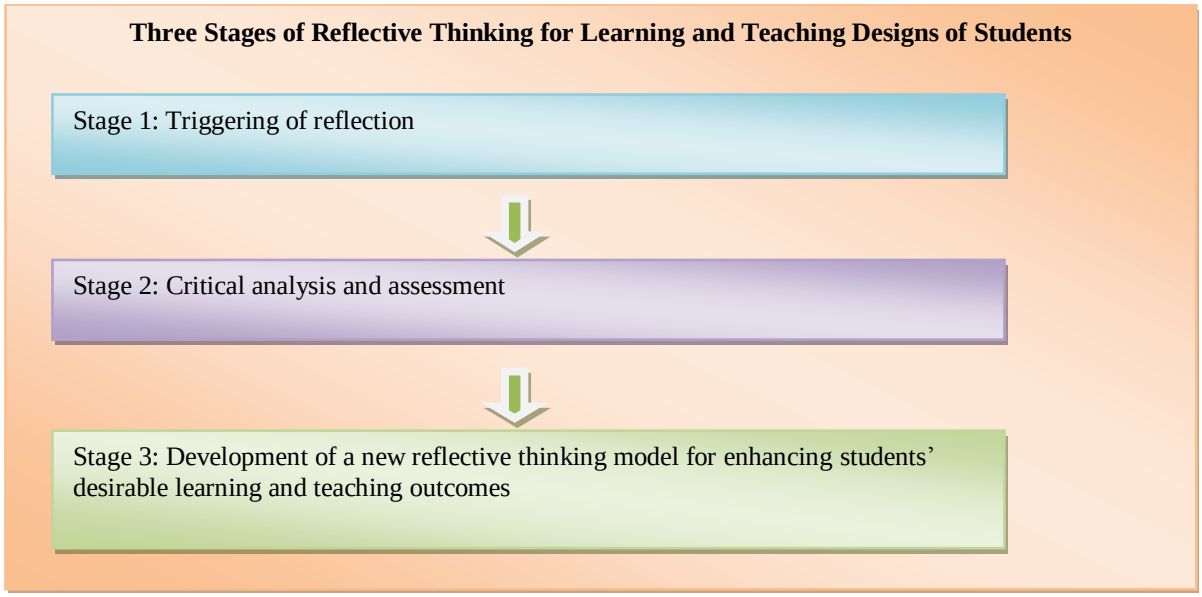

Figure 8. Three stages of reflective thinking for learning and teaching designs of teacher students.

Researchers participated with willing researchers to conclude the metacognitive model on self-explanation strategies used for specific problems connected to students' understanding of the process of reflection (Figure 8).

Data analysis

To ensure content validity, experts in the area of reflective thinking in Training Education College, Roi-Et Rajabhat University, Thailand

were asked to review the questions and assess the potential sample by the following means: recorded field notes, data codes and group dynamics.

Here, data were explained and interpreted to develop the *Reflective Thinking Instructional Model*.

RESULTS

The development of the reflective thinking instructional model for supporting student teachers is an important aspect of departmental education, upholding the fundamental belief that all student teachers are able to learn. Researchers emphasize on developing the reflective thinking model on learning and teaching designs; however, students have different learning preferences and educational subject status. Therefore, the researchers agree with Joyce et al. (2009) that teachers must not only be knowledgeable about the content they teach, but must also know and be committed to making decisions that involve the use of a variety of instructional strategies and approaches suited for particular purposes, and these must be appropriate to meet the diverse learning needs of students. Our argument here describes some of the most important models and techniques. The reflective thinking instructional model was composed of instructional strategies.

The reflective thinking instructional model

The five characteristics of the Reflective Thinking Instructional Model for supporting teacher students are indicated as follows:

Characteristic I: Goals of reflective thinking instructional model

The reflective thinking instructional model developed the ability of reflective thinking instructional processes of student teachers; their inner and outer behaviours toward reflective thinking abilities. The abilities are students' reflective thinking in learning environments and reflective teaching methods.

Step I: Relationship of Reflective Thinking Instructional Model. Guidelines for administrating organizers ought to be integrated into classroom materials to prompt students to learn.

Step II: Social System Relationship of Reflective Thinking Instructional Model. Social learning environments ought to prompt collaborative work with peers, teachers, and experts

Step III: Reflective Learning Responses of Reflective Thinking Instructional Model. Questioning strategies should be used to prompt the reflective thinking, specifically getting students to respond to *why, how,* and *what* specific decisions are described.

Step IV: Supporting System of Reflective Thinking Instructional Model. Learning experiences should be designed to include advice from teachers and co-learners. Classroom activities ought to be relevant to real-world situations and provide integrated experiences. Classroom experiences should involve enjoyable, concrete, and physical learning activities whenever possible, so as to ensure proper attention to the unique cognitive, affective, and psychomotor domain development of average school students.

Characteristic III: Application guideline of reflective thinking instructional model

The reflective thinking instructional model is applied to administer supporting learning and teaching steps: the natural satisfied and flexible course, learners' response to prompt reflective thinking from teachers' questions of *why, how,* and *what*. Social learning environments should encourage prompt collaborative work with peers, teachers, and experts. Students should have ethics attitudes, free expression of opinion, their reasons and empirical data. Students should do well in their assignments, be able to write and discuss through reflective thinking and specify their role in learning experiences of internal and the external classes.

Characteristic IV: Effects of Student Teachers on Reflective Thinking Instructional Model

Case I: Direct effects

These include to develop student teachers' reflective thinking abilities, to be able to think reflectively within the social learning environments; to have the freedom of expression, to have the opportunity to presume and solve problems to develop their needs, and create guideline data of management.

Case II: Indirect effects

Most student teachers ought to develop their self-confidence and social skills, to listen to individual divergent thinking, and to have a democratic system for

considering management guidelines. Thinking and decision foundational processes should be satisfactory in theory, and follow the right reason and context. Ethics of thinking process should include self-thinking and self-performance; written communication and speaking skills should be fixed up with the discussion of role-plays and self-decision.

Characteristic V: Assessing guideline on reflective thinking instructional model

Many questions from researchers who are teachers or instructors ought to be designed to help students know their identity and clarify overall and subordinate problems. Many opportunities have to be sought to engage students in gathering information to look for possible causes and solutions; ideas and activity sheets ought to help students evaluate the evidence they gather; questions should prompt students to consider alternatives and implications of their ideas; questions and activities should help students to draw conclusions from the evidence they gather and pose solutions. There should be opportunities for students to choose and implement the best alternative**,** and to monitor and reevaluate their results throughout the entire unit.

DISCUSSION

Developing the reflective thinking instructional model for student teachers' outcomes provided them a helpful framework for integrating certain models of their teaching. Ultimately, the value of the model is derived from the extent to which the teachers are able to use it to meet their instructional goals effectively and efficiently. Using cognitive approaches, Calhoun (2010)'s Information-Processing Teaching Model consists of techniques that are clearly cognitive in nature. They emphasize ways of enhancing students' innate desire to make sense of the world by acquiring and organizing information, solving problems, and developing concepts for conveying them. When administering this nature of model to four sample classes, it is interesting to reflect on students' responses, which can be seen to reflect from Vygotsky's socio-cultural theory of development, and the position in which it still applies to classrooms (Eggen and Kauchak, 2010).

With a focus on developing reflective thinking and an instructional model for supporting learning outcomes of student teachers, Dewey (1933) suggested that reflective thinking is an active, persistent, and careful consideration of a belief or supposed form of knowledge, of the grounds that support that knowledge, and of the further conclusions to which that knowledge leads. It gives awareness to students who are controlled by learning by actively participating in reflective thinking, assessing what they know, what they need to know, and how they bridge that gap during learning situations.

Looking at the development of the reflective thinking instructional model, it has been found that this situation was often associated with the work of Bruner (1966) and Piaget (1960), where discovery learning is one method of inquiry-based instruction. This approach often involves structured or directed activities that require students to formulate and test "hypotheses through hands-on experience" (Schunk, 2012, 491). One popular discovery-based procedure of this study is the three-step learning cycle.

Derived from Piaget's developmental theory, lessons based on this instructional model typically begin with exploration that involves a concrete, hands-on activity related to the lesson objectives. This concrete experience leads to concept invention step, during which students discover an important concept or relationship. The third stage of the learning cycle, concept extension, requires students to "directly apply the concept or skill learned during the invention activity" (Hartshorn, 2005: 2).

In terms of student teachers' outcomes using the instructional model for the development of reflective thinking, this model involves a wide range of thinking skills leading toward desirable outcomes and reflective thinking. It focused on the process of making judgments about what has happened. However, reflective thinking is most important in prompting learning during complex problem-solving situations, because it provides students with an opportunity to step back, to think about how they actually solve problems, and to consider how a particular set of problem solving strategies is appropriated for achievement (Moon, 1999).

This research study focused on the development of the reflective thinking instructional model for teacher students, not only just about how individuals think, but also about how they construct experiences more generally, including their thoughts, feelings, and social relations. This only requires individuals to reach a level of social maturity that allows them to distance themselves from social pressures, to take different perspectives, to make independent judgments, and to take responsibility for their actions.

SUGGESSIONS AND IMPLEMENTATIONS

The research study developed the reflective thinking

instructional model of student teachers using the participatory action research. The research methodology designed and developed learning and teaching model. Group members will then be able to compare and contrast their colleagues' interpretations of the project experience with their own. Students may learn about the strengths and weaknesses of the group, as it comprised the competencies and assumptions of its individual participants.

Considering this result, reflective thinking is an excellent tool for identifying positive and negative aspects of a group work experience. By spending time seriously and contemplating the overall process, both during and after the project, it is possible for group members to learn from their experience, and to work toward improving their group work skills for the future.

It is important to prompt reflective thinking in educating institutional students to support them in their reflective thinking. During this time period, students experience intellectual, emotional, social, and physical development. If they begin to shape their own thought processes and are at an ideal time to begin developing thinking, learning, and metacognitive strategies, reflective thinking provides average level students with the skills to mentally process learning experiences, to identify what they learned, to modify their understanding based on new information and experiences, and to transfer their learning to other situations. Scaffolding strategies should be incorporated into the learning environment to help students develop their ability to reflect on their own learning.

Normally, teachers face a myriad of daily choices: how to organize classrooms and curriculums, how to interpret students' behaviours; how to take individual learning process, and so forth. Many choices involve matters that a teacher can make and implement decisions automatically. Teachers make other decisions in the midst of an evolving situation after quickly reviewing the situation and recalling what has worked in similar scenarios. But teaching also involves complex choices about difficult problems that, if left unaddressed, often escalate. A different type of thinking is needed to address such choices.

Tough choices call for teachers to engage in sophisticated reflection, including their own self-reflection. Expert teachers adjust their thinking to accommodate the level of reflection called for in a given situation.

Their teaching is characterized by an intentional competence that enables them to identify and replicate best practice; refine serendipitous practice, and avoid inferior practice. Because of their ability to reflect, great teachers know not only *what* to do, but also why they do it.

Conflict of Interests

The authors have not declared any conflicts of interest.

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REFFERENCES

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