The Instructional Model of teaching ICT for the Grade 6 Students Based on Metacognition Approaches and Cooperative Learning

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Abstract

The purpose of this study were 1) to develop and propose the Information and Communication Technology instructional model based on metacognition approaches and cooperative learning for Grade 6 students in schools under Nakhon Sawan Municipality, 2) to implement this model into classroom, and 3) to investigate the effectiveness of this model on students' learning achievement. There were 2 steps in carriing out this study: 1) developing the instructional conceptual framework by reviewing related works and assessment and adjustment the instructional model by experts, 2) implementing this model by experimental research. The statistics used in this study were Mean, Standard Deviation, and T-Test (Paired and Independent Sample T-Test). The results show that 1) there were 3 phases of instructional model of ICT teaching based on metacognition and cooperative learning which were: Phase 1. An analysis of background and needs (learning goals, personnel in instruction, contents, learning environment, and measurement and evaluation); Phase 2. Instructional Model: Design, Development, and Implementation (preparing the learners, stimulus to the information they need about the study, guidelines for information seeking, data analysis and evaluation, and results of operation); and Phase 3. Evaluation (observing the students in individual and group, ability measurement and evaluation, test (multiple choice and open ended), and presentation evaluation). The results from the implementation phase was 1) there were differences in scores of learning achievement between pretest and posttest at .05 level of significant (at .00), 2) there were differences in scores of learning achievement between student taking part in ICT instructional model and taking part in traditional class at .05 level of significant (at .003).

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The results show that the ICT instructional model based on metacognition and cooperative learning encouraged the students' learning and should be explore to other schools setting.

Keywords: ICT Instructional Model, Cooperative Learning, Metacognition, Learning Management

Introduction

Nowadays, the development of Information and Communication Technology (ICT) has affected daily life which most of people using ICT to facilitate in terms of communication, work, and education. Many organizations adopt and adapt ICT in their own for many kinds of works such as human resource management, marketing, finance, and so on, so the employee should have the ability to use the ICT. Not only in the business sector, the education sector also has the policy in using ICT, for example, using Tablet, Mobile Phones, or the learning resource on the internet in many countries around the Globe. In Thailand, the educational policy that affects the learning management was providing Tablet for Grade 1 students across the country. The government provides hardware and software but did not give the right way to use it. It was sound from teachers who could not use this technology appropriately. Moreover, the curriculum in which Thai teachers have to create learning management plans to teach their kids in school by following the indicators from the central government are not suited to some schools and some schools are not managed under the Ministry of Education but are under Ministry of Interior control. In this study, I focus on the learning management for the schools under the municipality in Nakhon Sawan province to answer the research objectives which were 1) to create and propose the Information and Communication Technology instructional model based on metacognition approach and cooperative learning management for Grade 6 students of schools under Nakhon Sawan municipality, and 2) to enhance the students' learning achievement by using this model. The related literature, methodology, result, and conclusion/ discussion will be presented as following.

Related Works

The study of the Information Communication and Technology instructional model based on metacognition approach and cooperative learning management for the Grade 6 students have related works for reviewing and determining as the key concepts in developing the instructional model and also examination. Instructional Systems Design Models (ISD Model): the word "instruction" in term of education refers to helping people learn and develop structured behavior in cognitive, emotional, social, physical, and spiritual which performed by teacher. Sometimes, learning can certainly take place without instruction because it may be a natural process that leads to changes in what people know, what people can do, and how people behave (Gagne et. al. 2005). In Thai school setting, the Ministry of Education has guidelines on how teacher teach their student in various subjects. So that teachers have to create the instructional model and implement it to their students. Instructional systems design model (ISD Model) is the systematic guidelines in order to create a workshop,

a course, a curriculum, an instructional program or the instructional materials and products for educational programs. The most famous models are ADDIE and Dick and Carey instructional model. Metacognition: according to Flavell (1979, 1987), metacognition consists of both metacognitive knowledge and metacognitive experiences or regulation and often simply defined as "Thinking about Thinking" or "Cognition about Cognition" or "Knowing about Knowing" which consists of three basic elements: Developing a plan of action, Maintaining/monitoring the plan, and Evaluating the plan (NCREL, 1995). The term cooperative learning (CL) refers to an approach to group work or students working in groups or teams on projects or any tasks under conditions consisted of the groups/ teams members to complete the elements of the assignment or project. There are several definitions of cooperative learning having been addressed (David et. al. n.a., Smith et. al. 2005, and Johnson et. al. 1998). One of the most widely used in higher education is the Johnson & Johnson model which mention that cooperative learning is instruction that involves students working in teams to accomplish a common goal, under conditions that include the following elements (Johnson et. al.1998):

1. Positive interdependence. Team members are gratified to rely on one another to achieve the goal. If any team members fail to do their part, everyone will suffer consequences.

2. Individual accountability. All students in a group are held accountable for doing their share of the work and for mastery of all of the material to be learned.

3. Face-to-face promote interaction. Some of the group work may be done individually, some must be done interactively, with group members providing one another with feedback, challenging reasoning, sharing and conclusions, and perhaps most importantly, teaching and encouraging one another.

4. Appropriate use of collaborative skills. Students are encouraged and helped to develop and practice trust-building, leadership, decision-making, communication, and conflict management skills.

5. Group processing. Team members set group goals, periodically assess what they are doing well as a team, and identify changes they will make to function more effectively in the future. Cooperative learning is not simply a synonym for students working in groups. A learning exercise only qualifies as cooperative learning to the extent that the five listed elements are present.

Methodology

According to Figure 1, this study have 4 main contributors such as instructional model, ICT learning management, cooperative learning, and the purpose of this study were 1) to develop and propose the Information and Communication Technology instructional model based on metacognition approaches and cooperative learning for Grade 6 students in schools under Nakhon Sawan Municipality, 2) to implement this model into the classroom, and 3) to investigate the effectiveness of this model on students' learning achievement. To complete the research aims, there were 2 steps carried out in this study: 1) developing the instructional conceptual framework by reviewing related works and assessment and adjustment the instructional model by experts, 2) implement this model by experimental research which extend into 4 steps as follow (Figure 1);

Step One: development of Information and Communication Technology instructional model based on metacognition approaches and cooperative learning management for Grade 6 students by: 1) gathering information about instructional design and development, metacognition, teaching ICT to Grade 6 students, core curriculum and achievement indicators from primary and secondary sources such interviewing teachers, analysis and synthesis from documents (researches, papers, books, websites, and etc.), 2) developing an outline of ICT instructional model based on metacognition approaches and cooperative learning management, 3) developing ICT lesson plan prototype. Step Two: evaluating and remodeling Information and Communication Technology instructional model based on metacognition approaches and cooperative learning management for Grade 6 students by: 1) evaluating the Information and Communication Technology instructional model and lesson plans based on metacognition approaches and cooperative learning management for Grade 6 students by experts, 2) remodel and confirming Information and Communication Technology instructional model based on metacognition approaches and cooperative learning management for Grade 6 students. Lastly for Step Three: doing experimental research, by using two group pretest/posttest quasi-experimental research. The experimental steps has been carried out for 3 weeks based on lesson plans (learning management plans). The lesson plan came from the 3 phases of ICT instructional model based on metacognition and cooperative learning (Figure 1, 2, and 3). The pretest and posttest were given to students before and after class. The most important issue was human ethics used to prevent students' information and teachers who participated in this study.

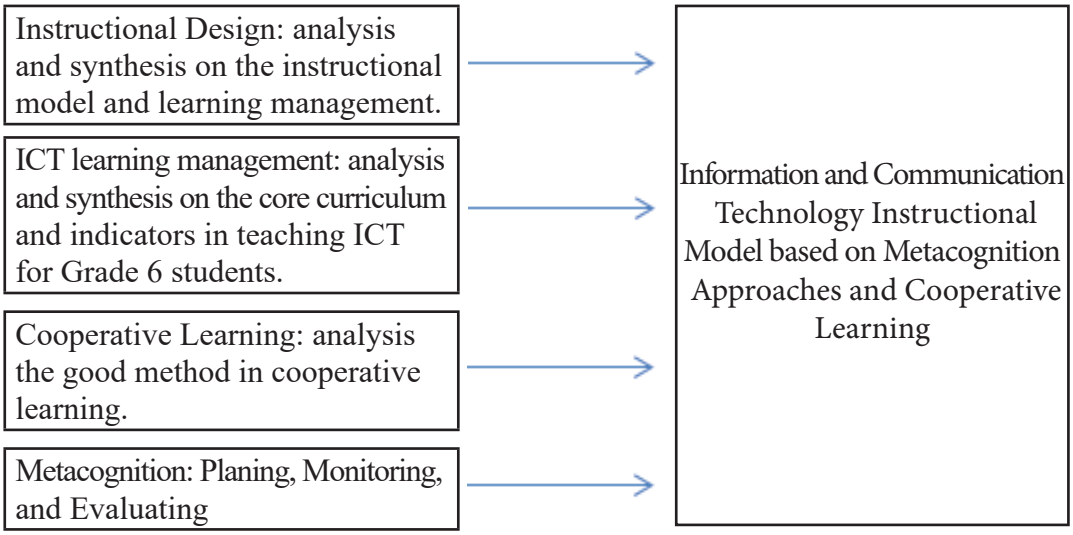

Figure 1 The Research Framework for ICT Instructional Model

Result and Conclusion

The results of this study will be presented in 2 steps as following:

Firstly, the ICT instructional model based on metacognition approaches and cooperative learning has 3 phases:

Phase 1. An analysis of background and needs (learning goals, personnel in instruction, contents, learning environment, and measurement and evaluation) (Figure 2);

Phase 2. Instructional Model: Design, Development, and Implementation (preparing the learners, stimulus to the information they need about the study, guidelines for information seeking, data analysis and evaluation, and results of operation) (Figure 3); and

Phase 3. Evaluation (observing the students in individual and group, ability measurement and evaluation, test (multiple choice and open ended), and presentation evaluation) (Figure 4).

Phase 1. An analysis of background and needs (Figure 2), was how to analysis the background and needs of teachers and students. The 5 factors: learning goals, personnel in instruction, contents, learning environment, and measurement and evaluation, were the information that teachers should be analysis before starting to writing lesson plans.

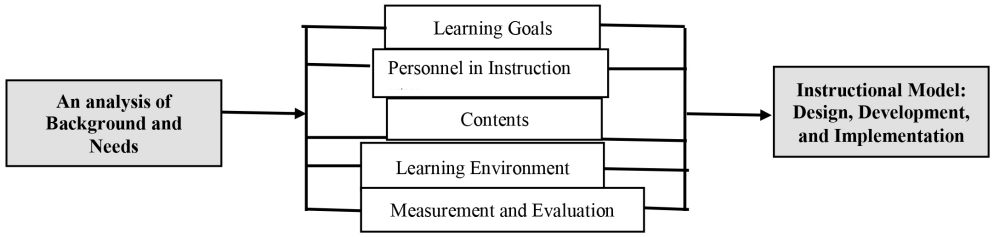

Figure 2 An analysis of background and needs

Phase 2 Instructional Model: Design, Development, and Implementation (preparing the learners, stimulus to the information they need about the study, guidelines for information seeking, data analysis and evaluation, and results of operation) (Figure 3), was preparing the learners (gain prior knowledge, connected prior and latest knowledge, summarized prior knowledge), secondly, stimulus to the information they need about the study (prioritizing primary and secondary data to study, students identify primary and secondary data needed), thirdly, guidelines for information seeking (guidelines for information gathering,considering the difference of comparative data and show the conflict of ideas of other students, given as a guide to seek information), fourthly, data analysis and evaluation (evaluate ideas and choosing the best approach, if the information is not complete, it should be researched further), and lastly, results of operations (conclude, explain the process). If there were insufficient data or the data is consistent with the objectives, the process will go back to 4. and then will go 5, after the students are already analyzed and evaluate.

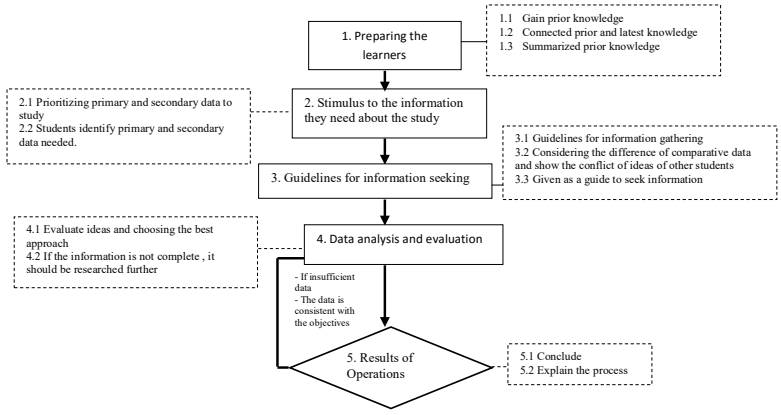

Figure 3 ICT Instructional Model based on Metacognition Approaches and cooperative learning: Phase 2 Instructional Model: Design, Development, and Implementation

Phase 3. Evaluation (Figure 4), was the essential phase because this phase will present the student achievement or performance. There were 4 main points or methods to evaluate student outcome: observing the students in individual and group, ability measurement and evaluation, test (multiple choice and open ended), and presentation evaluation.

Evaluation
1) Observing the students in individual and group, 2) Ability measurement and evaluation, 3) Test (multiple choice and open ended), and 4) Presentation evaluation

Figure 4 ICT Instructional Model based on Metacognition Approaches and cooperative learning: Phase 3 Evaluation

Secondly, from Table 1., the result from quasi-experimental research (using Paired t-test) shows that there were scores on posttest higher than score on pretest with differences in significance at 0.05. This mean that the use of ICT instructional model based on metacognition approaches and cooperative learning which was implemented in real teaching and learning in enhanced students' learning to achieve their goals and learning progress

Table 1 Result from Paired T-Test

learning achievement	Pretest		Posttest		t-test
	$\bar{x}$	S.D.	$\bar{x}$	S.D.	
learning achievement	17.48	1.57	23.17	1.79	.00*

P*<0.05 N= 35

Table 2 Result from Independent T-Test

Learning Outcome	N	Posttest		F	t-test
		$\bar{x}$	S.D.		
learning achievement (experiment group)	35	23.17	1.79	4.19	.003*
learning achievement (control group)	26	22.00	1.16		

P*<0.05

Moreover, from Table 2., the results from using ICT instructional model based on metacognition approaches and cooperative learning comparing between student who taking part in ICT instructional model and another group taking part in traditional class was difference at .05 level of significance (at .003) by student who taking part in ICT instructional model has higher scores of learning achievement than another group taking part in traditional class (23.17 VS 22.00). This means that using ICT instructional model based on metacognition approaches and cooperative learning enhanced students' learning achievement more than teaching without this model.

The result of this study could help teachers in elementary/ primary schools across Thailand in helping their students' learning in cooperative and have the ability to complete their study in the future.

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