

**MINISTRY OF EDUCATION AND TRAINING
THE VIETNAM INSTITUTE OF EDUCATIONAL SCIENCES**

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LE THI HONG CHI

**TEACHING FOR INQUIRY-BASED LEARNING
AT PRIMAY SCHOOL LEVEL WITH THE HELP
OF INFORMATION TECHNOLOGY**

Major: THEORY AND HISTORY OF EDUCATION

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**SUMMARY OF DOCTORAL DISSERTATION ON
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INTRODUCTION

1. Reason for choosing the project

1.1. The Resolution of the 8th Meeting, the Central Executive Committee XI (Resolution No. 29-NQ/TW) of radical innovations, comprehensive education and training up the task: "Innovating powerful method in teaching and learning towards modernization, promoting positive, proactive, creative skills and applying the learners' knowledge and skill, overcoming the imposed way of indoctrinating and rote learning. Focusing on teaching the way to learn, to think and encouraging self-study are the basis for the self-innovating and updating of knowledge, skills, capacity development".

1.2. Based on the learner-oriented perspective, helping students self-learn and discover new knowledge on previous knowledge and his life experiences, teaching for Inquiry-based learning increasingly demonstrates the ability to meet the requirements innovation of teaching methods. In particular, in recent years, teaching for Inquiry-based learning promotes strength in meeting the standards for student groups to integration capability assessment program international students (PISA), as well as the deployment requirements of school project model new Vietnam (VNEN) primary.

1.3. In fact, in current primary education, teaching towards promoting positivity students in general and teaching for Inquiry-based learning in particular do not achieve the desired effects. One of the reasons is because teachers do not have access to a primary process in accordance with teaching for Inquiry-based learning.

Therefore we need to research, develop procedures and measures in primary teaching for Inquiry-based learning. However, there hasn't any researches into the process carefully and meticulously on this issue so far.

1.4. Today, information technology and communications have been intruded into almost areas of human life. The use of information technology in teaching has become a huge trend of the world education in general and become a major policy of the Ministry of Education and Training in our country in particular.

From the above reasons, in order to contribute to improve the efficiency of innovative teaching methods in primary school, we select the topic: **"Teaching for inquiry-based learning in primary school with support of information technology"**.

2. Research objectives

Constructing the process teaching for Inquiry-based learning primary with the support of information technology to improve the efficiency of teaching Mathematics and Science in grades 4, 5 in particular, taught elementary school in general.

3. Objects and subjects of the research

- Objects: teaching activities with the support of information technology in primary school.
- Subjects: The relationship between teaching with the support of information technology operations and exploration of elementary students.

4. Hypothesis

If the building process of primary teaching for Inquiry-based learning based on students' life experiences, combined with the support of information technology will facilitate positive development of student activities, contribute to improving school performance episode.

5. Research tasks

5.1. Studying the basis of theoretical research and practice in primary teaching for Inquiry-based learning with the support of information technology.

5.2. Constructing in process teaching for Inquiry-based learning primary with the support of information technology.

5.3. Applying at the elementary processes teaching for Inquiry-based learning with the support of information technology in teaching Mathematics, Science grades 4, 5.

5.4. Experimenting pedagogically to test and confirm the feasibility of the teaching process is proposed.

6. Research scope

- Research Contents: research focused only on teaching for Inquiry-based learning with the support of information technology in Mathematics and Science subjects in grades 4, 5.

- Subjects Investigation: Personnel management, teachers and students in primary school.

- Geographical fieldwork: Hanoi, Phu Tho, Thai Nguyen, Quang Ninh, Lao Cai Province.

- Real-time survey state: School year 2011-2012.

- Organization in experimental: Hydrology Primary School (Vietnam Tri City, Phu Tho province), Extra High Primary (Lam Thao district, Phu Tho province), Son Duong Primary (Lam Thao district, Phu Tho province) .

- Real-time experience: academic year 2011 - 2012, 2012-2013.

- Conducted experimental subjects: Mathematics, Science Grades 4 and 5.

7. Research methods

The following methodology used in the thesis:

- Theoretical research methods

- Practical research methods

- Statistical-mathematical method

8. Defended theoretical points

8.1. Teaching for Inquiry-based learning with information technology support characteristics consistent with the teaching process in elementary school, ensuring "promote a positive, self-discipline, initiative learning of students", contribute to fostering academic skills, explore, search break, really "bring joy, excitement of learning for students."

8.2. Teaching for Inquiry-based learning in elementary school under construction processes are based on students' experiences, combined with the support of information technology, help students self-exploring, problem solving under the guidance of teachers are consistent, creating conditions for positive development of student activities, contributing to enhance teaching effectiveness.

9. New aspects of the dissertation

- On the basis of inheriting the other authors' view, the thesis overview and identify the scientific basis of teaching for Inquiry-based learning in elementary school with the support of information technology. That's the theory of relativity framework closely with the concepts and scientific point of inquiry, inquiry learning, teaching for Inquiry-based learning, information technology, teaching with the support of information technology, the nature of learning and exploration models, the effects and conditions of use of information technology to support learning in primary inquiry.

- Through the analysis, the actual survey, initial thesis outlines general picture of awareness, purpose and extent of use in primary teaching for Inquiry-based learning, reflect the reality of limited use teaching for Inquiry-based learning in elementary school with the support of information technology, analysis of the causes of the current situation, the advantages and disadvantages when using teaching for Inquiry-based learning with the support of information technology in the innovation of teaching methods in elementary school today.

- Proposing the principles and processes in primary generalized teaching for Inquiry-based learning with the support of information technology includes 6 steps, which specify the technical measures and teaching (from design to implementation) starting from the standard equipment, navigation, observation and guiding students to explore, compare, commented, concluded the nature of knowledge in organizations for students to practice, apply, and evaluate the results of searching. Based on analyzing the characteristics of the students level, as well as awareness programs, objectives and specific course content, specific chemical processes in general that teaching Maths and Science in grades 4, 5, help teachers easily apply teaching for Inquiry-based learning processes with information technology support to design specific lessons appropriately.

- Designing a lesson plan illustrated by the process proposed teaching (including selected design topics, explore activities with the support of information technology, given the question, all orientation, proposed guidance

levels, control inquiry to promote the idea of students, students active help overcome these difficulties, findings, build new knowledge). Teachers can use the lesson plans as a reference to support innovative teaching methods in general, teaching for Inquiry-based learning done with the support of information technology in Mathematics and Science subjects in grades 4, 5 in particular.

10. Structure of the research

Apart from the introduction, conclusion, references and appendices, the main contents of the thesis consists of three chapters:

Chapter 1. Scientific Basis on teaching for inquiry-based learning in primary school level with the help of information technology.

Chapter 2. Developing process based on inquiry teaching in elementary school with the support of information technology.

Chapter 3. Experimental pedagogy.

Chapter 1: SCIENTIFIC BASIS ON TEACHING FOR INQUIRY-BASED LEARNING AT PRIMARY SCHOOL LEVEL WITH THE HELP OF INFORMATION TECHNOLOGY

1.1. Overview of teaching for inquiry-based learning at primary school level with the help of information technology

1.1.1. In the world

So far, teaching for Inquiry-based learning is not new, strange to education in the world in general and Vietnam in particular.

Theory and origin of teaching for Inquiry-based learning are formed based on the ideas and researches of J. Dewey, J. Piaget and Vygotski. These people represented for an early theory teaching for Inquiry-based learning, J. Schwab, for instance, who encouraged teachers to use the lab to help students learn scientific concepts, Jerome S. Bruner - one of those with the first study to apply successful methods to explore practical teaching and J. Richard Suchman - father of teaching for Inquiry-based learning programs in the U.S., etc. ...

Currently, the research on teaching for Inquiry-based learning under the following major trends:

- Trend 1: Looking at the strengths and limitations of teaching for Inquiry-based learning

- Trend 2: Looking at the inquiry form and severity, pattern searching in teaching.

- Trend 3: Studying subjects teaching for Inquiry-based learning for learners.

- Trend 4: Researching teaching for Inquiry-based learning in training and retraining of teachers; in program development and compilation of teaching materials.

- Trend 5: Researching teaching for Inquiry-based learning with the support of information technology.

1.1.2. In Vietnam

In terms of theory, recently, there have been many research projects as well as articles of interest to teaching for Inquiry-based learning. The teacher gave concept, term, but they could not agree on the same ideology: "Teaching self-discovery" (Do Dinh Hoan, Nguyen Huu Hop, Nguyen Tuyet Nga), "Method rediscovered "(Nguyen Ky), "Constructivism - Inquiry" (Dang Thanh Hung, Le Nguyen Long) or "discovery learning", "discovery learning guide", "Teaching with activities discovery" (Tran Thuc Trinh, Tran Ba Hoanh, Bui Van Nghi, Le Vo Binh, Nguyen Van Hien, ...)"

As can be seen, the issue of exploring, discovering in teaching has been cared by the author, researched and applied at multiple levels and different ways.

Some researchers are mentioned in terms of the research methodology as: Nguyen Huu Chau, Dang Thanh Hung, Phan Trong Ngo, ...

Research on teaching for Inquiry-based learning in term of teaching methods, there are some researchers: Dang Thanh Hung, Tran Ba Hoanh, Tran Thuc Trinh, Pho Duc Hoa,...

Research on teaching for Inquiry-based learning in term of teaching techniques: Nguyen Phu Loc, Le Vo Binh, Nguyen Van Hien, Nguyen Tuyet Nga, Duong Giang Thien Huong, Nguyen Thi Hanh, Nguyen Thi Lan Anh, ...

Also, in recent years, the application of information technology in teaching courses in general, and primary in particular has also been studied and deployed with applications. Many authors with many research projects on building and using software to support teaching as: Dao Thai Lai, Nguyen Sy Duc, Nguyen Hoai Anh, Nguyen Thi Tuong Vi, Bui Phuong Nga, Tran Thuy Nga, ..., Information Technology Company of the school, Development Joint Stock Company of student software, student (www.phanmemsinhvien.net), ... have created a new trend of the times: information technology applications in teaching learning and education.

However, the use of information technology to help teaching methods, especially teaching for Inquiry-based learning process in primary school with the support of information technology has not been interested, insightful research, carefully.

Thus, for many reasons, teaching for Inquiry-based learning has attracted the attention of many authors. Although, each of them can be considered teaching for Inquiry-based learning follow different directions but they are trying to students may be the most active, respected role in the organization, control of teachers and the role of interactive activities in the classroom. These studies also showed that the use teaching for Inquiry-based learning in primary with the support of information technology is one of the contributing towards implementing innovative teaching methods, attention should continue to be studied in detail and successfully applied in the context of Vietnam.

1.2. The Basics Conceptions

1.2.1. Conception of Inquiry

Inquiry is the process of trying to find answers to these questions in order to achieve its objectives.

1.2.2. The concept of academic inquiry (Inquiry based learning)

Inquiry-based learning is a process of inquiry in which students actively involved in learning, posing questions, based on the actions of experimental nature, interacting with the learning objects that answers questions, findings, build new knowledge

1.2.3. Teaching for Inquiry based learning

In the thesis, we think: "Teaching for Inquiry-based learning is the teaching style in which teachers organize activities for students to seek out new knowledge through questions system, controlled trials or exercises direction".

1.2.4. Teaching with the help of information technology

Information Technology is a collection of scientific methods, technology and modern engineering tools for the production, transmission, collection, processing, storage and exchange of digital information. (Information Technology Law No. 67/2006/QH date 29/06/2006)

Teaching with the help of information technology is the process in which teachers teach and students to exploit the technical advantages of information technology to improve the quality and efficiency of the teaching process.

1.3. The nature and characteristics of teaching for inquiry-based learning

1.3.1. Psychological basis of teaching for inquiry-based learning

We can say, teaching for Inquiry-based learning is derived from tectonic approach in education. The point of tectonic approach in education is one of the important psychological bases of teaching for Inquiry-based learning.

1.3.2. The nature and models of Inquiry-based learning

1.3.2.1. The nature of Inquiry-based learning

It may be confirmed that the nature of the study is to explore the learning process, and learners have to perform operations on objects of experimental study, carry out the act of logical thinking, inductive, deductive, divergent thinking, etc. .. giving hypothesis and testing the hypothesis to detect the nature of knowledge.

1.3.2.2. Model of Inquiry-based learning

Inquiry-based learning is applied in a wide range of subjects, disciplines, educational levels so it has more models and explored different techniques. Although it can be said that the models still include all the general features and are divided into 2 basic periods.

- * Model of inquiry-based learning before the 1980

- * Model of inquiry-based learning today

Currently, many researchers give models of inquiry-based learning: 5 E model, model 6 stage ...

5 E model - a model under study guide tectonics theory consists of 5 steps: Engage, Explorer, Explain, Elaborate and Evaluation.

Specifically and details, the research team from the University of Alberta - Jenny Wilson and Wing Jan Leslie suggested an inquiry-based learning model consists of six steps:

- Step 1: Planning

- Step 2: Retrieving

- Step 3: Processing

- Step 4: Creating

- Step 5: Sharing

Step 6: Evaluating

This model is designed for the Inquiry-based learning at the Alberta University. It is proved that this model has broader applicability and can be applied for diverse subjects of inquiry. It is an important basis from which we can present the levels of Teaching for Inquiry-based learning and built up the process of Teaching for Inquiry-based learning in the primary education with the help of information technology.

1.3.2. Structure and pedagogic characteristics of Teaching for Inquiry-based learning

- The fundamental elements of Teaching for Inquiry-based learning are:
 - + The having-problem feature of learning content.
 - + Designing the student's inquiry activities, based on them, identifying the teacher's directional and organizational activities.
 - + Putting the students skillfully in the position of inquirers, (find new things for themselves), organize and control the process to be occur favorably from which the learners can build up the new knowledge for themselves.
 - + Testing and evaluating.
 - + For different kinds of teaching, the Teaching for Inquiry-based learning has the different relative distinguishing characteristics.
 - + Teaching for Inquiry-based learning is one of the learner-oriented teaching types, focusing on the process and teaching by approach capacity. Teaching for Inquiry-based learning promotes the activeness, self-discipline, independence and creativity of students.
 - + The inquiry, discovery in the school not to explore things that humans have not known but to help students acquire the knowledge that mankind has accumulated (to find new things for learners). Therefore, the topic for inquiring has to be interesting and in student's power and meet the needs of students.
 - + The learning process is a process of exploration, discovery. There is no available form of knowledge or skills to memorize and remember.
 - + Emphasizing on the way, the method to find new knowledge based on old knowledge and experiences of students in the investigation process, information extraction and cooperation with others, Teaching for Inquiry-based learning can contribute to teach students the learning methods as well as the inquiry and discovery skills.
 - + Though the Teaching for Inquiry-based learning not only need higher demand towards both teachers and learners and but also requires careful preparation time, the learners will understand and apply well the lessons with the theory and the reality. Besides, it can promote the ability and experience of each individual, develop the skills, means the learner-oriented teaching.
 - + Questions and the ways of questioning occupy a very important and necessary position, become a strategic in Teaching for Inquiry-based learning.
- The questioner may be teachers, pupils, and the most ideal subject is all the questions proposed by students.

Thus, the nature of the Teaching for Inquiry-based learning is to design a series of inquiry activities which are proportionate to the content of lesson, to instruct and control the learner's activities under the process and technique which are suitable with the learning purpose and the learner's ability. Then, the learning process of students becomes the inquiry-based learning process.

1.4. The help of Information Technology in Teaching for Inquiry-based learning.

In this part, the thesis mentioned three issues:

- The help of Information Technology in teaching.
- The effects of Information Technology in Teaching for Inquiry-based learning.
- The challenges of using Information Technology in Teaching for Inquiry-based learning.

In which, the first issue: "*The help of Information Technology in teaching*", the thesis said that

Today, Information Technology contributes an integral part in the improvement of the teaching and learning qualities. The educators and Information Technology professionals are trying to apply the Information Technology into the education in general and in the teaching methods in particular.

1.5. Teaching for Inquiry-based learning in primary school

1.5.1. Some characteristics of primary teaching

Compared with other levels of education, the teaching process in elementary school are more specific points. Through analyzing the characteristics of goals, programs, content, method, the elementary teachers and students, it can be affirmed that the Teaching for Inquiry-based learning is particularly suitable for use in primary schools.

1.5.2. The meaning and role of teaching for Inquiry-based learning

The Teaching for Inquiry-based learning is appropriate to the reform policy about teaching method in primary school of the Ministry of Education and Training and has a great for elementary teachers and students.

1.5.3 Requirements of the Teaching for Inquiry-based learning

To implement the Teaching for Inquiry-based learning in primary school, there are four requirements: Choosing the appropriate inquiry topic; Diversifying the inquiry-based leaning activities; Bringing into full play the help of medium and teaching equipment; Using flexibly the forms of Teaching for Inquiry-based learning.

1.5.4. The level of the Teaching for Inquiry-based learning

1.5.5. The trengths and weakness of the Teaching for Inquiry-based learning

1.6. Using Information Technology to help the Teaching for Inquiry-based learning

1.6.1. The principle of using Information Technology to help the teaching for Inquiry-based learning.

1.6.2. Forms of using Information Technology to help the Teaching for Inquiry-based learning.

1.6.3. The directions of retrieving the Information Technology to help the Teaching for Inquiry-based learning in primary school.

To use the Teaching for Inquiry-based learning with the help of Information Technology, teachers can retrieve the Information technology in two directions:

Trend 1: Extracting and using of the available software products to support the Teaching for Inquiry-based learning in primary school.

Trend 2: Using tool software to design the Information technology applications to support the Teaching for Inquiry-based learning in primary school.

1.7. The current situations of the Teaching for Inquiry-based learning with the help of Information technology

The survey result towards 1609 teachers and managerial staffs working in the primary sector in five provinces Lao Cai (225 teachers), Phu Tho (455 teachers), Hanoi (216 teachers), Thai Nguyen (251 teachers), Quang Ninh (462 teachers) and the attendance of 10 hours of classes at Cao Mai Primary School (Lam Thao, Phu Tho), Thuy Van Primary School (Viet Tri, Phu Tho) shows the highlights characteristics about the current situations of using Teaching for Inquiry-based learning with the help of Information Technology as follows:

1) Today, primary school teachers have certain knowledge about Teaching for Inquiry-based learning, initially aware of the important of Teaching for Inquiry-based learning with the help of Information Technology in teaching. However, the effectiveness is not as their expectation.

2) The process of Teaching for Inquiry-based learning with the help of Information Technology and the directions of pedagogic design with the help of Information Technology are very new contents in the perception of teachers nowadays. It is necessary to provide further training for teachers in both theories and skills if they want to apply Teaching for Inquiry-based learning with the help of Information Technology in primary school.

Conclusion of Chapter 1

The findings of the scientific basis of Teaching for Inquiry-based learning with the help of Information technology show that:

- Teaching for Inquiry-based learning has the prominent advantages about the ability to prove the student's activeness and is suitable with the orientation to reform the teaching method in our country nowadays.

- Information Technology really bring tremendous support, help the student's Inquiry-based learning activities become more easy, more interesting, more compelling, more profound, contribute to improve the efficiency of Teaching for Inquiry-based learning.

- The findings of the current situations show that the Teaching for Inquiry-based learning with the help of Information Technology has been interested in teaching at the elementary school but has not achieved the desired

effects. One of the reasons is that many teachers have not really grasped the nature of this teaching form and lacked of reasonable procedures, methods and teaching techniques.

By analyzing the theoretical basis and assessing the above current situations, we believe that research about Teaching for Inquiry-based learning is a necessary issue to contribute to improve the quality of primary school teaching. However, to implement effectively the Teaching for Inquiry-based learning with the help of Information technology, it is necessary to execute under the reasonable process, find out measures and use the teaching techniques in a suitable way with the current situations, the teacher's and student's characteristics and the teaching content in primary school.

CHAPTER 2

BUIDING UP THE PROCESS OF TEACHING FOR INQUIRY-BASED LEARNING WITH THE HELP OF INFORMATION TECHNOLOGY

2.1. Building up the process of Teaching for Inquiry-based learning with the help of Information Technology

2.1.1. *The principles of building up the process of Teaching for Inquiry-based learning with the help of Information Technology*

Principle 1: Ensuring the systematism

Principle 2: Promoting the role of design, navigation, help and creating favorable conditions for teachers

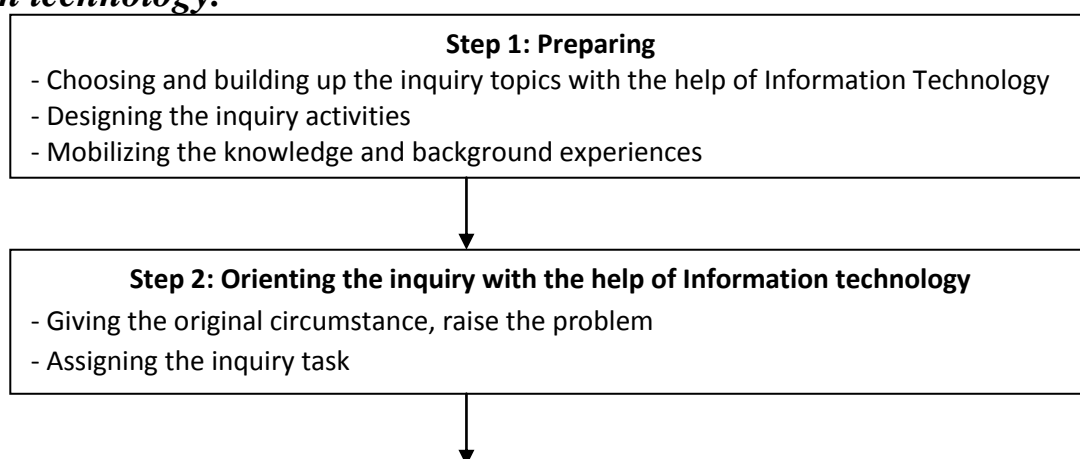
Principle 3: Ensuring the exploitation of the advantages of information technology to support Teaching for Inquiry-based learning in primary school

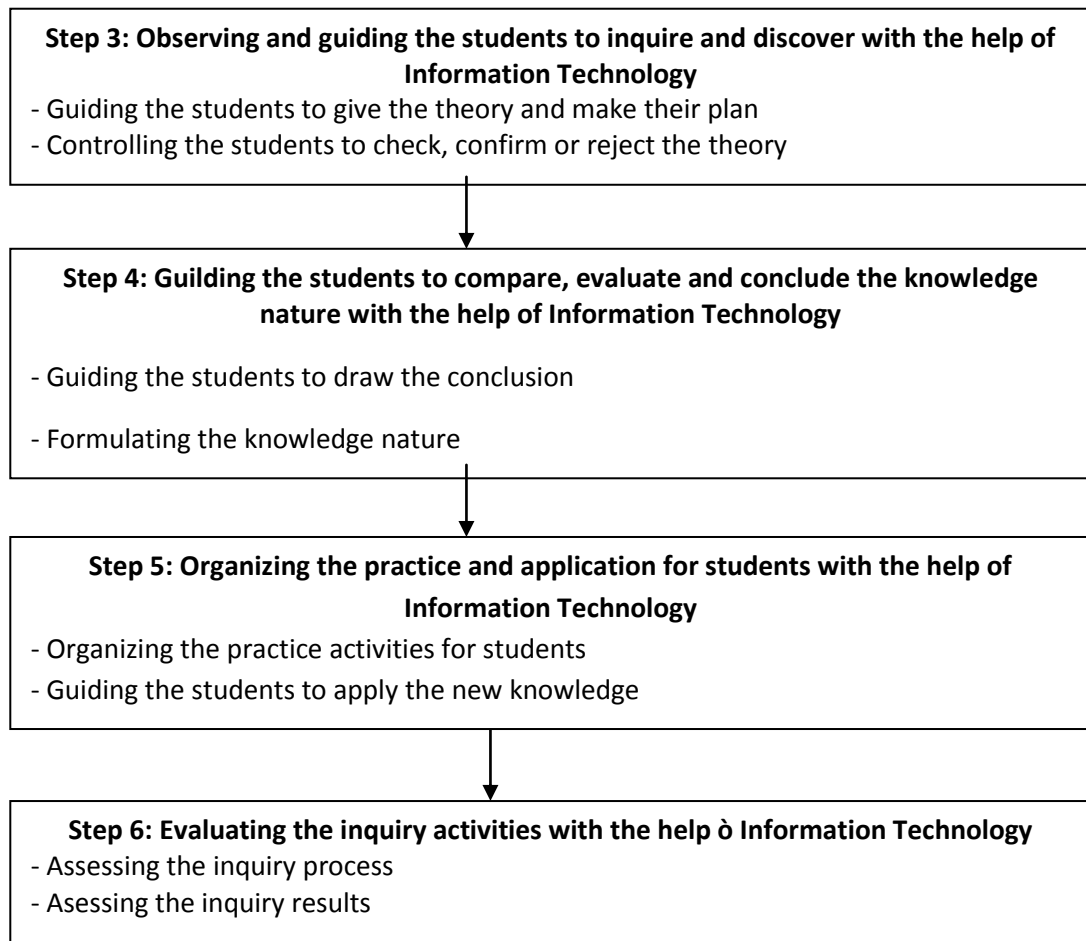
Principle 4: Ensuring the harmonious coordination between Teaching for Inquiry-based learning with the help of Information technology and the manipulation on real objects

Principle 5: Ensuring the flexibility, versatility

Principle 6: Ensuring the feasibility, practicality and efficiency

2.1.2. *The process of Teaching for Inquiry-based learning with the help of Information technology.*





2.1.3. Guiding the implementation process of Teaching for Inquiry-based learning with the help of Information Technology

In this content, the thesis presents an overview of methodologies, techniques and implementation process from step 1 to step 6 of the process with concrete illustrations to help teachers easily apply in the primary teaching process. For example, guiding the implementation of step 2 is as follows:

Step 2: The orientation of searching, discovering with the support of Information technology

*** The results need to be achieved:**

- To help pupils propose the title or get understood, interested in the duty requiring searching and discovering.

***How to implement:**

Teachers should help pupils orient to search, discover by many ways:

- You should use arising circumstances, which helps pupils self-propose the exploring topics.

To encourage the pupils to raise up the questions, select the topics for discussions, teacher can bring up some questions like:

- + Related to what problems you want to know?
- + In this part, anyone has any wonders, or get more understood?
- + Related to what we have learnt, What theory do you want to test?
- Transfer to explore an interesting topic to stimulate positive perceptions of students:
 - + Bring up a question to help students get orientation.
 - + Create the situation by asking students to predict, give hypothesis and experiment, etc.
 - + Providing a knowledge, a new requirement helps students identify themselves the tasks.
 - + Telling a story that hides interesting or strange, things which attract students.
 - + Describing an event, an actual circumstance creates a compelling issue which needs to be answered.
 - + Conduct an experiment to create a surprise...

*** Using IT to support the oriented exploration and discovery:**

IT can help teachers easily create problematic situations, motivation; stimulate pupils the interest, desire to explore, discover. IT help teachers transfer the information quickly, not only the words, but also the stereo, images, movies, ... which can create good effects for pupils.

For example, instead of a difficult question: "What is the property of water?", Teachers can project a short video clips (1-2 minutes) on the theme of water: *Water - the Source of life*, in which the image of water, accompanied by sound: "Water is a special substance on Earth, knowing more about it, it look more strange. Not many people know about the strange properties of water, and this is understandable. We can find water everywhere around us. Water accounts for three-quarters on the Earth". The video clip which warm up the lessons will help students be interested and give orientation for pupils. When the pupils have watched the clip, they may be wondering: What properties has the water got? Or how to know the properties of water?

2.1.4. The conditions to implement effectively the process of Teaching for Inquiry-based learning with the help of Information Technology

The thesis analyzes specifically teachers' and students' conditions, infrastructure, facilities, teaching equipment, learning environment and the

management, with special emphasis to the quality assessment of teachers' teaching, students' learning outcomes, program, elementary textbooks, and affirms that teaching for inquiry-based learning requires a corresponding adjustment in the assessment of students' academic progress.

2.1.5. The need-to-consider points when implementing the process of Teaching for Inquiry-based learning with the help of Information Technology in primary school.

The thesis refers to the point to help teachers handle some situations when teaching for Inquiry-based learning in primary schools with the support of IT, including: degree, learning how to guide students to explore; applying the steps in the process; teachers' difficulties and the solutions. In particular, the thesis has analyzed each issue, recommended how to proceed and has specific illustrations. For example, in many cases children not interested in exploring learning methods, there is a reason why I've said before exploration results. This happens very often because children in Vietnam are always reminded by teachers, parents to preview the next lessons about and the conclusions are often fully recorded in textbooks. Resolving this issue requires several measures:

* *Ask students to explain why* and the way to get the results, helping students know is not enough, the importance is why and how to "know", even when they know the results, they still have much to gain.

* *Using praise effectively by:* giving praise explicitly, specifying exactly why they are complimented (for example: "The student's idea of cutting rectangular into pieces and joining them into lozenges is very good. He has found the formula for calculating the area of rhombus ") and only praise the achievements of children gained by the effort. This makes students understand what the teacher says, she has high expectations and keep improving.

* *Collaborate with students' pupils:*

- Guide parents to learn how to teach children at home: If you read the lesson beforehand, rather than trying to remember what will be learnt for tomorrow (or the framed or bolded in textbooks), then list the things they do not understand, raise a few questions, indicate wonders, questions or set their own goals for the lesson. For example, if tomorrow's lesson is "rectangular area", ask your child that "Tomorrow I want to calculate the area of what? (A rectangular picture that he really likes, for example)

- If the topic is great to explore and takes times, students' activities are outside of the classroom (at home or at the workshop), teachers should inform students' parents, in which specify what the students' parents can do and should do to help their child. The parents should not leave out or feel too worried to do the exercises for their child.

For example, teachers can send the parents the following notice:

Dear Sir, Madam:.....

The topic for scientific study this month: **The breeding of animals**

Students' homework is observed, search the information and illustrations, make a report about insect reproduction. Parents can help by:

1. Remind the kids of the duty to be complete the homework, monitor the plan (When to do, with whom, by what, how, when to finish, etc.)

2. Let me see the programs on World Animal VTV2 channels at what time date month ... year Ask the kid to write out at least 2 questions that he wonders about what he has watched.

3. Let the child use a computer connected to the network to search information relating to the breeding of butterflies, ants, cockroaches ... Ask your child to summarize what he has learned after reading the information.

2.2. Applying the Teaching for Inquiry-based learning with the help of Information Technology to subjects in primary school

2.2.1. Applying inquiry-based teaching with the support of information technology in science in primary

In this part, the thesis is about to study 6 issues:

** Analyzing the programs, objectives and contents of the Science Subject in primary school.*

** Selecting the inquiry topics with the help of Information technology in the Science Subject in primary school*

** Designing the inquiry activities with the help of Information Technology in the Science Subject in primary school*

** Coordinating the inquiry activities with the help of information technology and using the experiments and real objects in Science subject in primary school*

** The process of Teaching for Inquiry-based learning with the help of Information technology*

2.2.2. Applying inquiry-based teaching with the help of IT in Maths in grades 4 and 5

In this part, the thesis is about to study 6 issues:

**Analyzing Mathematics program in grades 4 and 5.*

** Selecting the topics to explore with the help of IT in Maths in grades 4 and 5.*

** Designing the exploration activities with the help of IT in Maths in grades 4 and 5.*

**Coordinating the exploration activities with the help of IT and using the traditional belongings in Maths in grades 4 and 5.*

** Basing process teaching on exploration with the help of IT in Maths in grades 4 and 5.*

** Illustrating designed the exploration lessons with the help of IT in Maths in grades 4 and 5.*

Table 2.2. The process of Teaching for Inquiry-based learning with the help of Information Technology in math in grades 4, 5

Step	Teacher's activities	Student's activities	
Step 1: Preparation	<ul style="list-style-type: none"> -Selecting, constructing inquiry themes with the help of Information Technology. -Designing inquiry activities. -Mobilizing knowledge and basic experience + Giving task, question requiring knowledge reproduction + Using open-ended questions to help students link old and new knowledge 	<ul style="list-style-type: none"> - Reproducing the old knowledge. -Thinking, answering questions, expanding basic knowledge 	
Step 2: Orienting inquiry with the help of Information Technology	<ul style="list-style-type: none"> -Giving situation -Asking question raising issues -Giving inquiry task 	<ul style="list-style-type: none"> - Being aware of inquiry issues -Appearing inquiry demand -Identifying inquiry task 	
Step 3: Observing and guiding students inquiry	<i>Inquiring mathematical concepts</i>	<ul style="list-style-type: none"> - Guiding students to work with real objects, pictures, drawings, diagrams, images imitating mathematical concepts on the computer. 	<ul style="list-style-type: none"> - Observing real objects, drawings, diagrams, photographs imitating mathematical concepts on the

with the help of Information Technology		- Guiding students to observe and discover signs of the nature of concepts, concept formation.	computer. - Manipulating, analyzing , comparing, synthesizing, generalizing, discovering and forming mathematical concept
	<i>Inquiring rules, methods</i>	- Guiding students to directly manipulate on real objects , pictures, graphics, and the visual aids designed in the form of animation on computer - Guiding students to make predictions about the rules and methods; to propose and realize ways to test hypothesis	- Directly manipulate on real objects , pictures, graphics, and the visual aids designed in the form of animation on computer - Making predictions and proposes; implementing ways to test hypothesis; discovering rules, methods.
	<i>Inquiring in mathematics homework</i>	- Guiding students to directly manipulate on real objects , pictures, graphics, and the visual aids designed in the form of animation on computer - Guiding students to make predictions about how to solve mathematics exercises; to propose and realize ways to test hypothesis	- Directly manipulate on real objects , pictures, graphics, and the visual aids designed in the form of animation on computer - Making predictions, testing and discovering methods to solve mathematics exercises
Step 4: Guiding students to compare, comment, draw conclusion about the nature of knowledge with the help of Information Technology		-Organizing, controlling students' discussions; discovering issues in groups / classes; making knowledge become exact.	- Cooperating with partners in the group / class - Self - test, evaluate, draw conclusions
Step 5: Organizing for students to practice and apply with the help of Information Technology		- Controlling activities in applying and practicing knowledge that is just discovered	- Applying and practicing knowledge that is just discovered

Step 6: Evaluating inquiry activities with the help of Information Technology	<ul style="list-style-type: none"> - Organizing for students work quizzes on computer - Guiding and creating opportunities for student have self-assessment about their activities and their partners -Suggesting new inquiry issues 	<ul style="list-style-type: none"> -Working quizzes on computer - Having self-assessment about process, inquiry results of students and their partners -Proposing and accepting new inquiry issues
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Conclusion in Chapter 2

The findings in chapter 2 of the Thesis allow to draw some conclusions:

1. Inquiry - based learning with the help of Information Technology is one of the activities that will bring a positive impact on students' success. However, applying Teaching for Inquiry-based learning at primary school level with the help of information technology should base on some suitable orientations which emphasize diversification of inquiry activities.
2. Teaching for Inquiry-based learning is not omnipotent teaching style. To effectively apply Teaching for Inquiry-based learning, a number of certain conditions need to be ensured, especially, role of teacher should be paid attention.
3. With the goal of helping students actively construct knowledge for themselves, process of Teaching for Inquiry-based learning at primary school level with the help of information technology needs to be built from viewpoint of program review, contents, primary school teaching plan, as well as the relationship between psychological characteristics of elementary students and the ability to discover. The process needs to demonstrate clearly the design and organization of inquiry activities for students. However, that teaching process is just instruction in nature, a technical instruction for teachers. Because teaching is a not only science but also art, when applying to each specific subject in primary school level, teachers need to be flexible and creative to match the characteristics of the subject and their student. Doing like that, using Teaching for Inquiry-based learning at primary school level with the help of information technology brings result as expected.

CHAPTER 3 EXPERIMENTAL PEDAGOGY

3.1. An overview of the experimental process

3.1.1. Experimental purposes

To test effectiveness and feasibility of process and technique Teaching for Inquiry-based learning at primary school level with the help of information technology which was built.

3.1.2. Experimental content

We carry out experimentation 10 lessons in Math in grade 4, 5, in Science in grade 4, 5 according to process and technique Teaching for Inquiry-based learning at primary school level with the help of information technology which was built.

3.1.3. Experimental Subjects

** Choosing the experimental schools*

We carry out experimentation at primary schools in Phu Tho province are Cao Mai Primary School (Lam Thao district), Son Duong Primary School (Lam Thao district) and Thuy Van Primary School (Viet Tri city). These are three primary schools in three different residential areas, with different from class size, student and professional requirements for teachers.

** Choosing the experimental classes*

To ensure that the experimental results are objective, we decide to choose the classes whose characteristics and conditions are similar (in term of intellectual capacity of student, student number, professional qualifications, seniority and the individual merits of teachers) as the experimental class and the control class. Basing on this criteria, we choose the class 4A (Cao Mai Primary School), 4A (Son Duong Primary School), 4A, 5A (Thuy Van Primary School) as the experimental classes; 4B (Cao Mai Primary School), 4B (Son Duong Primary School), 5B (Thuy Van Primary School) as control classes.

3.1.4. Experimentation plan and method

** Experimental plan*

Experimentation is conducted in 2 phases:

Phase 1: Explored experimentation: Semester I - 2011-2012 School Year: Science in grades 4, 5.

Phase 2: Impacted experimentation:

Round 1: Semester II - 2011-2012 School Year: Science in Grade 5

Round 2: 2012-2013 School Year: Math in grade 4, 5, Science in grade 5

** Experimental Methods*

We organize experimentation as follows:

- 1) Examining and evaluating before experimentation.
- 2) Organizing training for students and teachers participating experimentation.
- 3) Conducting experimentation.
- 4) Examining and evaluating after experimentation.
- 5) Analyzing, comparing, contrasting results before and after the experimentation.

3.1.5. Standards and scale in experimentation

3.2. Explored experimentation

Observing six lessons and teaching one lesson 5th grade Science, in grade 5 A, Thuy Van Primary School that have experimental teaching by Teacher Nguyen Thi Thu Thuy. Results after Explored experimentation initially confirm the feasibility and effectiveness of processes Teaching for Inquiry-based learning at primary school level with the help of information technology that are proposed in Thesis.

3.3. Round 1 of impacted experimentation

Experimentation is conducted in Science in grade 5 at Thuy Van Primary School. Analyzing quantitative and qualitative results after Round 1 of impacted experimentation can be stated that: learning outcome of students in experimental classes is higher than that in control classes, learning inspiration of students is developed when they have inquiry activities with Information Technology, experimental lessons hit standards about developing positiveness of students in learning and students in experimental classes initially have inquiry skill. If students practice frequently, this skill will be enhanced quickly.

3.4. Round 2 of impacted experimentation

Round 2 of impacted experimentation is implemented in three subjects: 4th Math, 5th Math, 4th Science with scope of both grade 4 and 5 of the three primary schools is extended. The experimental results are analyzed qualitatively and quantitatively.

From the quantitative and qualitative results after round 2 of impacted experimentation, it can be stated that applying Teaching for Inquiry-based learning at primary school level with the help of information technology brings about certain effects.

3.5. Handling generally experimental results

3.5.1. Synthesizing experimental results

Quantities which indicate score of experimental and control group are shown through the following tables:

Table 3.4. Description of data

STT	Quantities	Experimental classes	Control classes
1	Mode	8	7
2	Median	8	7
3	Mean	7,83	6,90
4	Standard Deviation (SD)	1,162	1,335
5	Coefficient of Variation (CV)	0,13	0,17

Synthesizing experimental result of two research groups shows that, according to description of data, score result in experimental group is higher than that in control group. Mode is 8 in experimental group, 7 in control group.

Median is 8 in experimental group, 7 in control group. That Standard Deviation (SD) of experimental group is lower than that in control group shows equality in awareness. Coefficient of Variation (CV) is lower than that in control group. Results of comparing *continuous data*, *discrete data*, *correlation testing* allows to confirm that: process and technique of Teaching for Inquiry-based learning at primary school level with the help of information technology we proposed are feasibility. The hypothesis of the thesis has been proven.

3.5.2. General Evaluation of experimental results

The results after three rounds of experiments show that:

Teaching for Inquiry-based learning at primary school level with the help of information technology has the obvious effects indicated in the following:

-Students are enticed to participate in activities, learning inspiration is stimulated to grow.

-Lesson is spirited. Students understand the content of the lesson, enthusiastically involve inquiry activities and express their thoughts.

-Creating a positive learning environment with high interactivity between students with students, students with learning software, teachers and students; providing opportunities for all students participate in activities to create new knowledge.

Conclusion in Chapter 3

From result of pedagogy experimentation, some basic conclusions can be drawn as following:

Firstly, the quality of teaching some experimental lesson increases markedly compared with quality of initial survey before the experiment. Percentage of students who have good and very good scores in experimental system is higher, and percentage of average scores and below average scores decreases than that in control system. This is a very important result of quantitative aspect, a base to initially demonstrate the feasibility of applying Teaching for Inquiry-based learning with the help of information technology in teaching Mathematics, Science in Grades 4, 5 in particular and teaching in primary school level in general.

Secondly, experimental results show that teachers and students start being familiar to process, technique of Teaching for Inquiry-based learning we proposed. This affirms that if Teaching for Inquiry-based learning at primary school level with the help of information technology is applied reasonably, it will contribute to improving teaching effectiveness.

CONCLUSIONS AND RECOMMENDATIONS

1. Conclusions

From result of Teaching for Inquiry-based learning at primary school level with the help of information technology, some basic conclusions can be drawn as following:

1.1. In terms of theory, Teaching for Inquiry-based learning is teaching style in which teachers guide students' to find new knowledge based on the inquiry-oriented exercises, questions. Using this type of teaching with the help of information technology shows many advantages of the ability to promote students' active learning, conforming to education reform in our country today.

1.2. In terms of practice, teachers have relatively awareness about the true nature of Teaching for Inquiry-based learning, attitude in favor of Teaching for Inquiry-based learning at primary school level with the help of information technology. However, it is rarely used and the efficiency is not high. Survey results about actual situation in awareness and use Teaching for Inquiry-based learning at primary school level with the help of information technology in reality confirm: The development and application of processes of Teaching for Inquiry-based learning at primary school level with the help of information technology is urgent and necessary.

1.3. In process of applying Teaching for Inquiry-based learning at primary school level with the help of information technology, inquiry learning model is very important, orientation for teachers in inquiry activities design, implementing instruction for students in the learning process. Besides, to Teaching for Inquiry-based learning at primary school level with the help of information technology brings effectiveness, a certain number of conditions need to be prepared carefully.

1.4. The research findings in Thesis allow to conclude that: Process of Teaching for Inquiry-based learning at primary school level is based on life experiences of the students, in the dialectical relationship between teachers and learners, combination with the help of information technology creates conditions to develop positive activity of students and contribute to improving the efficiency and quality of the teaching process in elementary school.

2. Recommendation

2.1. For education management agencies

Identifying clearly Teaching for Inquiry-based learning is teaching style which conforms to orientation in teaching method reform in primary school level.

Being concern timely and creating more favorable conditions for investment in school facilities and teaching equipment for the schools to contribute to the external environment factors which are favorable for teaching process with the help of information technology.

Researching to build and expand widely electronic archives, especially the visual media which can be manipulated, the teaching software in primary school level, free of charge on the internet to create conditions for teachers, students in primary school exploit and use conveniently.

Strengthening qualification of teachers in primary school on innovating teaching methods in general, Teaching for Inquiry-based learning with the help of information technology in particular by: building material on innovation of teaching methods according to the small module (module on Teaching for Inquiry-based learning) with short duration and the way for teachers self-study; training teachers about Teaching for Inquiry-based learning; organizing for teachers write about personal experience initiatives in Teaching for Inquiry-based learning, and having the form of exchange of experience initiatives in each school, school group, so on.

2.2. For primary school teachers

Needing to positive self-learning and equipping with the theoretical basis about Teaching for Inquiry-based learning at primary school level to use in the teaching process and contribute to improving teaching effectiveness.

In process of applying Teaching for Inquiry-based learning with the help of information technology, there should be an exchange, learn from experience and continue to propose solutions to use reasonably Teaching for Inquiry-based learning with environment and teaching specific conditions, contribute to complement theoretical basis of Teaching for Inquiry-based learning at primary school level with the help of information technology.

2.3. For educational institutions for teachers in primary school

Renewing content and methods of training primary teachers, bringing the teaching style as: Teaching for Inquiry-based learning, Cooperative teaching, teaching based on case studies, so on, in content of program “subject teaching methods in pedagogical schools”, ensuring student teachers after graduation have knowledge and skills about Teaching for Inquiry-based learning, meeting the requirements of practical innovation.

**LIST OF SCIENCE WORKS RELATED TO THESIS
HAVE BEEN PUBLISHED**

1. Le Thi Hong Chi (2011), "The status of information technology's application in teaching at Primary Schools in Phu Tho province", *The summary record of Conference Tectonics theory in primary education*, Hanoi University of Pedagogy.
2. Le Thi Hong Chi (2012), "The application of Inquiry method in teaching Maths of the 4th grade", *Journal of Education*, No. 281.
3. Le Thi Hong Chi (2012), "The support of information technology in *inquiry* teaching in elementary schools", *Journal of Education*, No. 86.
4. Le Thi Hong Chi (2012), "The basis of *inquiry* teaching in elementary schools", *Journal of Education*, special issue, October.
5. Le Thi Hong Chi (2012), "The study on teaching for Inquiry-based learning in the world and in Vietnam", *Journal of Education*, special issue, October.
6. Le Thi Hong Chi (2013), "The situation of teaching for Inquiry-based learning with the help of information technology at Primary Schools", *Journal of Education*, No. 97, October.