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DEVELOPING MATHEMATICS TEACHING COMPETENCE FOR PRIMARY SCHOOL TEACHERS IN THE INTEGRATED TEACHING APPROACH

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2. Le Trung Hieu, Nguyen Danh Nam (2019), Teacher's competence of integrated teaching at primary schools. Journal of Physics: Conference Series, vol.1340, 012023, IOP Publishing. (Scopus)
3. Le Trung Hieu (2017), Integrating Science in Mathematics Teaching in Vietnamese Elementary Schools. Annals. Computer Sciense Tome 15, Fasc.2 Romania, 2017.

National Publications

1. Le Trung Hieu (2020), "Research on building competency profiles of primary school teachers", Education Management Journal, No. 12, pp.121-128.
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3. Le Trung Hieu (2017), "Developing the competence to apply knowledge for high school students through teaching mathematics and science", Journal of Psychology, No. 3/2017, pp.80.
4. Le Trung Hieu, Dong Dai Nghia (2016), "Perspectives on integrated teaching in mathematics and science in high school", Journal of Educational Management, 8/2016, pp.47.
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INTRODUCTION

1. Reason for choosing the research topic

The industrial revolution 4.0 leads to profound changes in all areas of social life. In order to promptly adapt to the daily and hourly changes, people need to be equipped with new knowledge and skills, and adjust their behavior in accordance with the new ones that are constantly appearing. John Dewey said that in essence, education is the perfection of each individual; educators have the duty to lead, guide, and pass on to the next generation all that they can, to make the next generation more developed and perfect (refer to [11]).

Resolution 29-NQ/TW dated November 4, 2013 of the 8th Conference of the Party Central Committee, session XI on fundamental and comprehensive reform of education and training clearly indicated this point of view [1]. This has confirmed the innovative orientations in education and training, including primary education.

A fundamental innovation orientation in primary education is to integrate teaching contents and methods, reduce the number of subjects, and increase educational activities to focus on developing students' competence [2]. The above innovation policy is also consistent with the educational trend of countries around the world, especially developed countries with advanced education such as the United States, the United Kingdom, Finland, Germany, France, Australia, Canada, Japan, Korea, etc. In general, in these countries the process of primary education is organized to create a very exciting learning environment for students through creative experiential activities. Teaching content is designed according to topics including many activities inside and outside the classroom that are closely related to reality and relevant to children. In particular, the content and educational methods are the integration of one or several subjects.

First: *Stemming from the concept of integrated teaching*

Recently, many domestic scientists have researched and published research results on the issue of integration in teaching content, contributing to the development of curricula.

Researchers such as Do Huong Tra (2014) [45], Nguyen Cong Khanh (2013) [26] present about the issue of integrated teaching and the issue of teacher training to meet the requirements of interdisciplinary integrated teaching. Also in the approach of teacher training, Thomas Edwin (2014) in his research on the competence of teachers upon graduation mentioned an integrated model for both learning and teaching in teacher training. This study also shows the enjoyment and effectiveness of enhancing teaching competence for students through practicum and the great value of this activity.

Some researchers such as Ha Thi Lan Huong (2015) [24]; Do Huong Tra [45] are interested in integrated teaching as a teaching trend to develop students' competence; ... accordingly, integrated teaching has the main characteristic, that is different knowledge and skills are mobilized and linked by students to solve a task of integrated learning activities.

According to Do Huong Tra (2014), “integrated teaching is a pedagogical perspective in which learners need to mobilize (all) resources to solve a complex-problematic situation in order to develop competencies and personal qualities” [45]. According to the general education program issued together with Circular No. 32 dated December 26, 2018 of the Ministry of Education and Training [8], integrated teaching is understood as *"a teaching approach to help students develop their ability to mobilize and synthesize knowledge and skills, etc. in many different fields to effectively solve problems in learning and in life, implemented right in the process of knowledge acquisition and skill training"*

According to Xavier Roegies (1996) [37], integrated teaching is understood as a process wher the teacher organizes for students to simultaneously mobilize knowledge and skills in many different fields to solve learning tasks, thereby forming new knowledge and skills, and developing the necessary competencies. Thus, integrated teaching should not be understood as a teaching method, a teaching technique but a teaching orientation or a pedagogical point of view. Moreover, in order to achieve the goal of developing student's competence, integrated teaching is also a requirement, a need of education, and thus becomes a task placed on the shoulders of teachers in the new context of teaching and learning.

However, the researcher of this thesis believes that integrated teaching is not necessarily the mobilization of "a lot" of knowledge and skills in many different fields to organize teaching for students. First of all, from a practical perspective, during teaching hours, if teachers organize learning activities in which students need to mobilize knowledge and skills by topic, combine some relevant contents in a lesson unit, teach a certain unit of knowledge that has connections with some other knowledge units and other subjects, etc., it is integrative teaching.

Second: ***Stemming from the goal of integrated teaching***

Integrated teaching will accomplish the following goals and benefits: Practices in many countries show that integration is a teaching trend (including integration in objectives, in contents and in teaching methods) important in developing learners' competence. This trend will make students' learning more meaningful than teaching knowledge, subjects and educational aspects separately; integrated teaching solves the imbalance between volume, level and content of each learning stage; integrated teaching enhances the support between contents and between subjects, eliminates duplication, increases students' ability to form and apply knowledge. The most important goal is that integrated teaching is a method of forming and developing students' competence.

Third: ***Stemming from the need for integrated teaching***

This issue is related to general educational goals and teaching goals. Today, education has moved from the question "What knowledge and skills should be equipped for students, what qualities should be given to them?" to the question of "what and how to teach students so that they can "do" some basic and fundamental jobs and be ready to become useful citizens for society?". Therefore, the goal of teaching has been changed from the goal of equipping knowledge and training skills to forming and developing competence. To do this, it is necessary to have a thorough and comprehensive study of the subjects in the approach of associating these subjects with the overall educational goals to design the curriculum and teaching contents to make sure they are the most basic, concise and sufficient and to ensure the achievement of educational objectives. Integration is a trend and also a requirement to perform this task.

Reality also shows that the amount of knowledge is increasing day by day; moreover, there is a deeper and deeper relationship and interference with each other. Therefore, teaching content A may be related to some contents B and C of other subjects. Thus, integrated teaching is necessary.

Another trend in education is to associate education with practice, knowledge with life, and school with society. This goal is also the basis for the implementation of integration in education in general and integration in teaching in particular.

Next, in order to carry out teaching according to the integrated program, integrated goals, integration orientation, the question is what teachers need to have, what competencies should be prepared for integrated teaching.

Based on the general educational philosophy, the principles of the general education program in 2018 can be determined as follows: Based on the competence and competence development of learners; Based on standards, especially learning standards; Integrate contents appropriately according to the learning stages; Facilitate the development of preschool education and improve the effectiveness of higher education; Orient learners; Facilitate self-study.

Integrated teaching (together with differentiated teaching and experiential activities) is one of the teaching methods in the approach of competence development outlined in the 2018 general education program development orientation. Integrated teaching puts an emphasis on teaching contents. Integrated teaching also demonstrates the professional competence of primary school teachers in teaching activities. Teachers can teach many subjects and carry out many educational activities.

In the context of global innovation with the strong impact of the 4.0 revolution, competence development for teachers in integrated teaching of mathematics in primary schools has become an urgent requirement in our country. With the above reasons, the researcher chooses the topic: "*Developing mathematics teaching competence for primary school teachers in the integrated teaching approach*".

2. Research objectives

- Determine the components and levels of developing math teaching competence for primary school teachers in the integrated teaching approach.

- Propose a number of pedagogical measures to develop Mathematics teaching competence for primary school teachers in the integrated teaching approach.

3. Research subject and object

3.1. Research object

The process of developing math teaching competence for primary school teachers in the integrated teaching approach.

3.2. Research subject

Fostering (retraining) and developing math teaching competence for primary school teachers in the integrated teaching approach.

4. Scientific hypothesis

If the components of the math teaching competence of primary school teachers are identified in the integrated teaching approach and pedagogical measures are proposed to foster teaching competence, it will contribute to improve teaching competence in an integrative orientation for primary school teachers.

5. Research questions

5.1. Why to develop math teaching competence for primary school teachers in the integrated teaching approach?

5.2. How to evaluate math teaching competence for primary school teachers in the integrated teaching approach?

5.3. How to develop math teaching competence for primary school teachers in the integrated teaching approach?

6. Research tasks

6.1. Theoretical research on the contents

- Psychological, pedagogical and philosophical foundations of the development of math teaching competence for primary school teachers in the integrated teaching approach.

- Clarify the objectives, characteristics, teaching contents, characteristics of integrated teaching, and the competence to teach Mathematics of primary school teachers in the integrated teaching approach.

- Identify the concept of integration in mathematics education.

- Study the profile of competence development of primary school teachers to meet the requirements of educational innovation, in which the mathematics integrated teaching competence is one of the core competencies.

- Assess the level of teaching competence development of primary school teachers in integrated teaching of Mathematics.

- Propose measures to develop math teaching competence for primary school teachers in the integrated teaching approach.

6.2. Survey of the current situation

- Survey the current situation of fostering (retraining) math teaching competence for primary school teachers in the integrated teaching approach.

- Analyse the current situation of teaching Mathematics of primary school teachers in the integrated teaching approach.

- Survey the current situation (via interviews, questionnaires, ...) to build a profile of developing math teaching competence for primary school teachers.

6.3. Pedagogical experiment

- Organize quantitative and qualitative pedagogical experiments to test the feasibility and effectiveness of the proposed measures.

7. Research scope

The thesis focuses on researching and proposing measures to develop math teaching competence for primary school teachers in the integrated teaching approach.

8. Research Methods

8.1. Theoretical research methods

Review and study domestic and foreign documents related to the thesis.

8.2. Methods of observation, investigation, interview

Conduct research, discussion, interview, poll on the issue "the current situation of math teaching of primary school teachers in the integrated teaching approach."

8.3. Expert method

Discuss with some experts on some orientations for the research topic as well as to objectively evaluate the research results.

8.4. Pedagogical experiment

Organize pedagogical experiments to consider the necessity and feasibility of the research contents.

8.5. Mathematical statistical methods in educational science

Collect, process and evaluate data, etc. to evaluate the feasibility of the proposed measures.

9. Contributions of the thesis

- Develop the concept of teaching Mathematics from the point of view of integrated teaching.

- Identify the components and manifestations of the math teaching competence of primary school teachers in the integrated teaching approach.

- Build a profile to develop math teaching competence for primary school teachers.

- Evaluate the current situation of fostering teaching competence by topic for primary school teachers of Mathematics.

- Design criteria and tools to evaluate the development of math teaching competence for primary school teachers in the integrated teaching approach.

- Propose measures to develop math teaching competence for primary school teachers in the integrated teaching approach.

10. Arguments to defend

- The components and levels of development of math teaching competence of primary school teachers in the integrated teaching approach of mathematics have a scientific basis.

- The pedagogical measures to develop the math teaching competence of primary school teachers in the integrated teaching approach are scientifically based, feasible and effective.

11. Thesis structure

In addition to the introduction and conclusion, the thesis consists of 4 chapters:

Chapter 1: Theoretical basis

Chapter 2: Practical basis

Chapter 3: Some measures to develop math teaching competence for primary school teachers in the integrated teaching approach.

Chapter 4: Pedagogical Experiment

Chapter 1 - THEORETICAL BASIS

1.1. Literature Review

1.1.1. Foreign studies

Regarding the integrated curriculum model, there are three common types in the world: *the interdisciplinary model, the problem-based model, and the theme-based model.*

1.1.2. Domestic studies

Regarding the integrated teaching of Mathematics in primary schools, the following works can be mentioned:

+ Nguyen Thi Chau Giang (2020), Training skills in designing and using integrated teaching situations in Mathematics for students majoring in Primary Education, PhD thesis in Educational Sciences, Vinh University.

+ Nguyen Thi Chau Giang (2018), *"The process of designing teaching situations in Mathematics in primary school", Proceedings of the international scientific conference "Integration in Mathematics education and teacher training",* Hanoi University of Education, pp. 64-70.

+ Pham Quang Tiep (2015), *Designing integrated lessons in primary schools. Proceedings of the national conference on training and developing human resources for primary education,* Hong Duc Publishing House, pp. 146-150.

+ Duong Minh Thanh and Truong Thi Thuy Ngan (2016), "Some integration ideas in teaching Mathematics in primary schools", *Scientific Journal of Ho Chi Minh City University of Education.* No. 7 (8) 2016, p. 28-40.

Studying the above results of integrated teaching, we apply them to research and develop solutions to develop integrated Mathematics teaching competence for primary school teachers.

Based on the above studies, the following conclusions can be drawn:

For teaching at primary school in general and math teaching in particular, principles, it is important to identify scientific basis, and how to organize and apply them to the teaching process in order to develop math teaching competence for primary school teachers.

In Vietnam, there have been steps to develop integrated teaching competence for teachers in science subjects, including Mathematics. Domestic and foreign studies are categorized by the researcher in two main research directions: Intra-disciplinary and interdisciplinary integration.

1.2. Key concepts

1.2.1. Competence

1.2.2. Teaching competence

The researcher of the thesis conceptualizes teaching competence as follows: *teaching competence is the competence to teach and satisfy basic requirements by mobilizing and synthesizing knowledge, skills, experiences, and personal psychological attributes such as interests, beliefs, will, etc. to analyze and design lessons; organize teaching activities; examine, evaluate and manage the classroom appropriately in order to successfully carry out teaching activities and meet teaching objectives.*

1.2.3. Contents and characteristics of Mathematics in primary school

The new Mathematical Education Program 2018, the requirements and orientation for implementing integrated teaching have been included in the content of Mathematics in primary schools, requiring teachers to know how to implement integrated and interdisciplinary teaching when selecting Mathematics teaching contents and methods. This requires the ability of primary school teachers to teach Mathematics in an integrative and interdisciplinary orientation.

1.2.4. Primary school teachers' competence to teach Mathematics

The competence to teach Mathematics of primary school teachers is reflected in the ability to mobilize and apply general knowledge of Mathematics and the theory of teaching Mathematics in primary schools in planning for teaching mathematics; organizing and carrying out classroom teaching activities; studying program, etc. in order to meet the requirements of teaching and learning Maths.

1.2.5. Integration

"Integration is an organic and systematic combination of knowledge/concepts of different subjects into a unified content on the basis of theoretical and practical relationships mentioned in those subjects.

1.2.6. Integrated teaching

Integrated teaching is an orientation in educational innovation, a transformation from a content-based approach to a competency-based approach to teaching in order to train dynamic and creative people capable of applying knowledge when solving real-life problems.

1.2.7. Mathematics Integrated teaching and Mathematics integrated teaching competence

1.2.7.1. Mathematics Integrated teaching

Integrated teaching for Mathematics in primary school is the process by which teachers design topics and organize teaching to help students mobilize and synthesize knowledge, skills, attitudes, experiences, etc. in order to effectively solve problems in learning and life; this process is done right in the process of acquiring knowledge and practicing skills.

1.2.7.2. Mathematics teaching competence of primary school teachers in the integrated teaching approach

Accordingly, the integrated teaching competence of primary school teachers is also formed on the basis of knowledge, skills and attitudes. According to the researcher, the integrated teaching competence of primary school teachers can be described in a general way as follows:

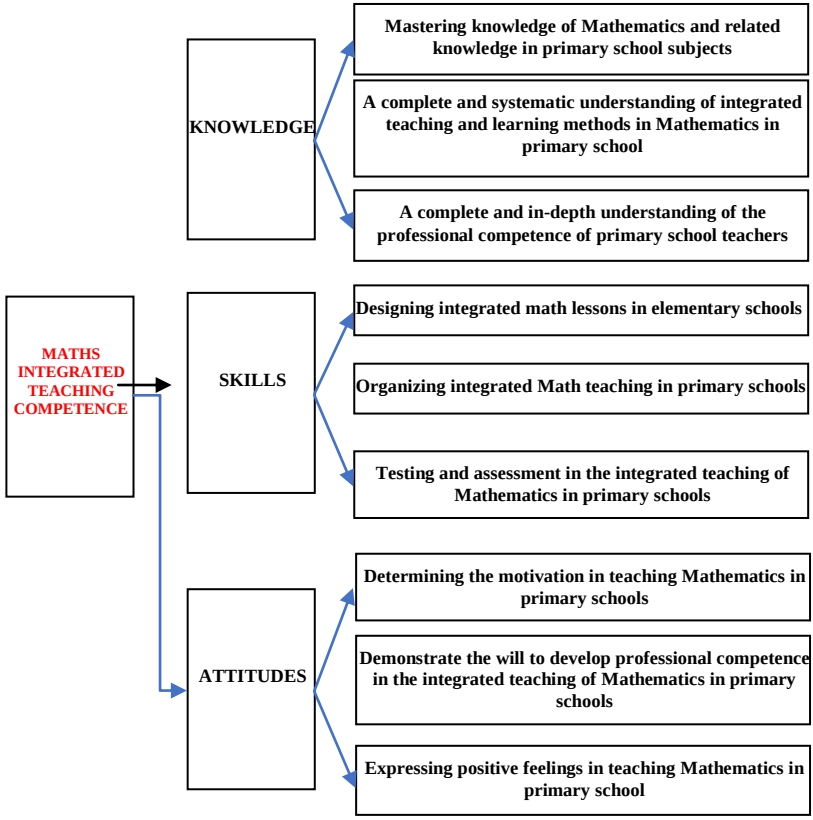

Figure 1.1. Diagram of primary school teachers' competence to teach Mathematics in the integrated teaching approach

1.2.8. Components of primary school teachers' competence to teach Mathematics in the integrated teaching approach

1.2.8.1. Scientific basis to propose competency components for integrated teaching

1.2.8.2. Expression of basic competence components of primary school teachers for integrated teaching

In Table 1.5, the thesis describes the manifestations of the component of integrated teaching competence with level 1 (knowing to do, not yet proficient), level 2 (competent) and level 3 (creative, knowing how to instruct others); the highest desired level is 3 and the lowest is 1.

Table 1.5. Descriptions the components of integrated teaching competence

Competence components	Levels and manifestations		
	1	2	3
Competence to define teaching goals	Determining subject knowledge objectives to determine teaching objectives suitable to the subject program, basic types of activities and specific objectives of each activity such as forming new knowledge.	Determining subject knowledge objectives to determine teaching objectives suitable to the subject program, basic types of activities and specific objectives of each activity associated with practice, suitable for specific learners.	Determining subject knowledge objectives to determine teaching objectives suitable to the subject program, types of activities and specific objectives of each activity associated with practice and other subjects. Support and guide colleagues to achieve the set goals.
Competence to make integrated teaching plans	Understanding the theory of educational program development, general education program, building teaching program, school plan according to standards.	Applying the theory of developing educational programs, general education programs, building teaching programs and school plans according to standards.	Applying the theory of developing educational programs, general education programs, building teaching programs and school plans according to standards. Support and guide colleagues to develop.
Competence to design integrated lesson plans	Research and learn the possible activities sequence of students. Develop ideas for organizing activities. Design and organize those activities in the approach of assigning tasks for students to practice and acquire knowledge and skills. Organize the teaching in the planned way.	Research and learn the possible activities sequence of students. Develop ideas for organizing activities. Design and organize those activities in the approach of assigning tasks for students to practice and acquire knowledge and skills. Organize the teaching in the planned way. Handling possible pedagogical situations, anticipating difficulties and problems that need to be removed.	Research and learn the possible activities sequence of students. Develop ideas for organizing activities. Design and organize those activities in the approach of assigning tasks for students to practice and acquire knowledge and skills. Organize the teaching in the planned way. Handling possible pedagogical situations, anticipating difficulties and problems that need to be removed. Support and help colleagues develop.
Language competence in integrated teaching	Know the attitude and behavior of pedagogical communication; Behaving flexibly in teaching in accordance with practical contexts, complying with ethical standards, and communicating in accordance with genders. Through language expressing the relationship between subjects.	Understand the attitude and behavior of pedagogical communication; Behaving flexibly in teaching in accordance with practical contexts, complying with ethical standards, and communicating in accordance with genders. Through language expressing the relationship between subjects. Understanding and respecting international culture, appropriate behavior in foreign partnerships.	Apply attitude and behavior to pedagogical communication; Behaving flexibly in teaching in accordance with practical contexts, complying with ethical standards, and communicating in accordance with genders. Through language expressing the relationship between disciplines. Understanding and respecting international culture, appropriate behavior in foreign partnerships. Support and cooperate with colleagues.
Collaborative competence in the integrated teaching process	Know and implement the law related to the rights and responsibilities of schools, teachers, students, and scientists.	Understand and implement the law, advocate and propagate the rights and responsibilities of schools, teachers, students, and scientists.	Support and help colleagues understand and implement the law, advocate and propagate the rights and responsibilities of schools, teachers, students, and scientists.

Competence components	Levels and manifestations		
	1	2	3
Competence to design and create an integrated teaching environment	Participating in creating a teaching environment that collects and processes information in cultural, economic, political, social, historical, residential conditions... to build and maintain a friendly environment with positive students.	Actively create a teaching environment that can collect and process information in cultural, economic, political, social, historical, residential conditions... Organize to build and maintain a friendly environment with active students. Guide and supervise students to participate in improving the school's educational environment.	Summarize experiences, support colleagues and mobilize forces to build and create a teaching environment. Collecting and processing information in terms of culture, economy, politics, society, history, population... Organize to build and maintain a friendly environment with active students. Guide and supervise students to participate in improving the school's educational environment.
Competence to connect lesson contents with practice	Know the teaching methods that integrate the lesson contents into practical contexts, seek the connection of knowledge with social issues.	Evaluate, adjust and apply teaching methods that integrate lesson content into practical contexts, seek the connection of knowledge with social issues.	Summarize, cooperate, support colleagues in evaluating, adjusting and applying teaching methods that integrate lesson content into practical contexts, seeking the connection of knowledge with social issues.
Competence to organize integrated teaching	Know the teaching methods to make plans, build learning resources for teaching and organize activities in accordance with the teaching objectives. Guide students to do so, thereby realizing the teaching goal.	Apply teaching methods to make plans, build learning resources for teaching and organize activities in accordance with teaching goals. Assign tasks, manage student learning tasks and handle pedagogical situations. Guide students to do so, thereby realizing the teaching goal.	Share experiences, support colleagues to apply teaching methods to make plans, build learning resources for teaching and organize activities in accordance with teaching goals. Assign tasks, manage student learning tasks and handle pedagogical situations. Guide students to do so, thereby realizing the teaching goal.
Competence to assess learning outcomes	Know about the science of measuring and assessing students' progress in the learning process. Use traditional and non-traditional assessment tools (project outputs, observations, learning records, etc.). Assess students' progress throughout the learning process.	Understand the science of measurement and assessment to collect and process information to detect student progress in the learning process. Use traditional and non-traditional assessment tools (project outputs, observations, learning records, etc.). Assess students' progress throughout the learning process.	Apply the science of measurement, collaborative assessment and supporting colleagues to collect and process information to detect student progress in the learning process. Use traditional and non-traditional assessment tools (project outputs, observations, learning records, etc.). Assess students' progress throughout the learning process.

Based on the identification, analysis, and specific illustration of the components of integrated teaching competence of primary school teachers (table 1.5), it can be seen that these components are consistent with the standards of primary school teachers' competence, meeting the requirements of educational innovation in the approach of developing learners' competence, approaching modern teaching theory in the world.

This 9-component integrated teaching competency framework of primary school teachers is the basis for studying assessment criteria and developing measures to foster these competencies for teachers to meet educational innovation requirements.

1.2.9. Criteria to assess the level of teaching competence development of primary school teachers in integrated Mathematics teaching

The survey results show that the necessary competencies of primary school teachers for integrated teaching include:

1.2.9.1. About expertise and knowledge

Table 1.6. Competence: expertise and knowledge - educational science

Minimum requirements	Indicators
Competency standard A1: Understanding student learning activities	
A1.1 Demonstrate understanding of how students learn in relation to the student's age.	A1.1.1 Give examples of how students' cognitive, psychophysiological, social, emotional, and moral development can affect their learning. A1.1.2 Prepare integrated learning activities appropriate to the student's level of cognitive, linguistic, social, emotional, and physical development.
A1.2 Demonstrate an understanding of how different approaches to integrated instruction can meet the individual learning needs of students.	A1.2.1 Identify different teaching methods to help students with different genders, ethnicities, cultures, abilities, and learning needs to learn better. A1.2.2 Prepare integrated, focused, and explanatory learning activities that assist students to associate new concepts with prior knowledge and experiences.
Competency standard A2: Know how to use available teaching technology for integrated teaching	
A2.1 Demonstrate understanding of a variety of teaching, learning strategies and resources.	A2.1.1 Planning and experience, provide opportunities for learning, student interaction, investigation, problem solving and creativity. A2.1.2 Use teaching methods, strategies, and materials as specified in textbooks and low-cost additional support materials to support student learning.
A2.2 Demonstrating the rational use of information and communication technology in integrated teaching and learning.	A2.2.1 Describe the strategy to support responsible, safe and relevant use of information technology for integrated teaching and learning, both at school and for personal use.
Competency standard A3: Know how to communicate well with students and their families	
A3.1 Demonstrate an understanding of the primary school teacher's roles, and expected duties	A3.1.1 Describe the roles and responsibilities of teachers according to the standards issued by the Ministry of Education and Training.
A3.2 Demonstrate an understanding of the social, linguistic and cultural diversity of students and their communities.	A3.2.1 Identify the sociocultural background of students, parents, community elders and educational administrators when interacting with them in the integrated teaching process. A3.2.2 Give examples of strategies to support all students' participation in integrated classroom learning activities.
Competency Standard A4: Master the Curriculum	
A4.1 Demonstrate an understanding of the structure, content and expected outcomes of the primary education curriculum.	A4.1.1 Describe the key concepts, content, learning objectives, and outcomes of the core curriculum for the target learners. A4.1.2 Prepare a lesson plan that reflects the requirements of the training program and includes relevant integrated teaching and learning activities and materials. A4.1.3 Describe the assessment principles that underlie the core curriculum.

Minimum requirements	Indicators
Competency Standard A5: Master the integrated subject contents	
A5.1 Demonstrate understanding of issues to teach integrated subjects in the classroom.	A5.1.1 Describe important concepts, skills, techniques and applications in teaching integrated subjects in the classroom. A5.1.2 Include in lessons relevant and accurate information, examples and exercises to assist students in learning core subject contents and developing skills. A5.1.3 Describe the methods used to promote integrated learning in the main subjects: math, science, and sociology in the classroom and real life.
A5.2 Demonstrate understanding of how content is delivered depending on students' learning responses, learning needs, and contexts.	A5.2.1 Describes how to contextualize learning activities that are appropriate to the student's age, language, ability, and culture to develop their understanding of the subject matter related to principles, ideas, and concepts. A5.2.2 Explain how lessons are contextualized and give examples related to contents, concepts, and topics. A5.2.3 Describe the student's approach to development in reading comprehension and solving math problems.

1.2.9.2. Professional and practice skills

Table 1.7. Professional and practice skills

Minimum requirements	Indicators
Competency Standard B1: Combining a variety of methods in an integrated curriculum	
B1.1 Demonstrate competence in teaching integrated subject matters	B1.1.1 Clearly explain the curriculum contents and intended learning outcomes. B1.1.2 Select instructional materials to link learning with students' prior knowledge, interests, daily life, and local needs. B1.1.3 Encourage students to be aware of their own ideas to build new understanding.
B1.2 Competence to apply different strategies in integrated teaching and learning.	B1.2.1 Use appropriate strategies for integrated teaching and learning in the classroom. B1.2.2 Using Math knowledge to support students learning in different areas of expertise. B1.2.3 Provide opportunities for students to investigate integrated subject matter, contents and concepts through hands-on activities.
B1.3. Demonstrates well integrated lesson plans and preparation that are tailored to the student's learning abilities and experiences.	B1.3.1 Plan and structure lessons to ensure all lessons are delivered effectively. B1.3.2 Provide lesson introductions to link new learning with prior knowledge, to capture students' interest and encourage them to learn. B1.3.3 Prepare a teaching experience that focuses and continuously integrates the areas of learning and is always enthusiastic about the interests and experiences of the students. B1.3.4 Use techniques and visual examples to introduce and illustrate concepts learned.
Competency Standard B2: Assess, monitor and report on student learning	
B2.1 Competence to monitor student progress and assess student learning.	B2.1.1 Planning and using tasks for assessment, integrated with learning activities. B2.1.2 Use assessment to allow students to demonstrate achievements in a variety of ways. B2.1.3 Use questioning and discussion techniques to test students, learn and provide feedback.

Minimum requirements	Indicators
B2.2 Competence to keep records, make detailed assessments, and use assessment information to guide student learning progress.	B2.2.1 Record student learning process accurately and consistently. B 2.2.2 Use various authentic assessments to monitor student progress and inform the next curriculum plan. B2.2.3 Communicate students' academic progress and achievement to students, parents, and other educators.
Competency Standard B3: Creating a safe and supportive learning environment for students	
B3.1 Competence to create a safe and productive learning environment for all students.	B3.1.1 Use classroom space, materials, and resources to ensure the participation of all students in integrated learning. B3.1.2 Encourage students to interact with each other and work independently and in groups.
B3.2 Demonstrate strategies to manage student behavior.	B3.2.1 Encourage students to interact with each other with mutual respect and safety. B3.2.2 Learn to know each student's needs and interact regularly with all students B3.2.3 Encourages well-regulated behavior among students by collaborative team work and independent learning.
Competency Standard B4: Working together with teachers, parents and the community	
B4.1 Demonstrate strategies to work together with other teachers, parents, and the local community to improve integrated learning environments for students.	B4.1.1 Inform positively to others about the primary school culture and curriculum to promote understanding among parents. B4.1.2 Describe strategies for engaging parents in their children's learning at school, at home, and in the community. B4.1.3 Consider colleagues' perspectives in their efforts to respond to learning problems and accept feedback in a positive way.

The results of identifying and describing in detail the criteria for assessing the integrated teaching competence of primary school teachers in teaching Mathematics in terms of knowledge and practical skills (Tables 1.6 and 1.7) can serve as the basis for the construction and measurement of the effectiveness of measures to foster the integrated mathematics teaching competence for primary school teachers.

1.3. Theme-based teaching

1.3.1. The concept of theme-based teaching in teaching Mathematics in primary schools

Theme-based teaching is a teaching process in which teachers design a theme that integrates some of the content of Mathematics and organizes implementation according to the integrated education orientation of the overall 2018 general education program, helping students not only discover knowledge but also apply general knowledge to solve practical meaningful tasks related to mathematics.

1.3.2. Basic features of theme-based mathematics teaching in primary school

1.3.3. Characteristics and forms of theme-based Mathematics teaching in Primary School

CONCLUSION FOR CHAPTER 1

Based on relevant research results in the world and in Vietnam, the thesis has focused on clarifying the issues of the theoretical basis of integrated teaching in primary schools.

The researcher of this thesis conceives that integrated teaching in primary schools aims at forming and developing students' competencies, helping students apply knowledge of mathematics and related disciplines to solve real-life problems. Competency is the ability of the subject to combine flexibly, in a logically organized manner, knowledge and skills with attitudes, values, and motivations, in order to meet the complex requirements of an activity, ensuring that the activity achieves good results in a certain context (situation). That method is integrated teaching. However, the researcher of this thesis believes that integrated teaching is not necessarily the mobilization of "a lot" of knowledge and skills in many different fields to organize teaching for students. First of all, from a practical perspective, during teaching hours, if teachers organize learning activities in which students need to mobilize knowledge and skills by topic, combine some relevant contents in a lesson unit, teach a certain unit of knowledge that has connections with some other knowledge units and other subjects, etc., it is integrative teaching.

The thesis has identified the components and indicators of the levels of development of Math teaching competence for primary school teachers in the integrated teaching approach, thereby proposing an integrated teaching competency framework. The theoretical basis of the research has clarified a number of concepts of competence, teaching competence, integrated teaching competence in Mathematics; components and indicators of primary school teachers' competence to teach Mathematics; characteristics of theme-based teaching in Mathematics at primary school.

Chapter 2 - PRACTICAL BASIS

2.1. Profile of developing Mathematics teaching competence for primary school teachers

Table 2.1. Groups of general and specific competencies of primary school teachers

Group of general competencies	Descriptions
Competence to plan a lesson	- Set learning goals for the whole class and for individual students - Take into consideration the society, culture and school's culture, background and framework, teaching theory, lesson planning, including establishing learning towards achieving set goals.
Competence to use teaching methods	- Coordinate teaching methods, apply teaching aids such as digital devices and other resources related to teaching into teaching practice. - Design and apply methods, exploit and develop effective and appropriate teaching materials and means for students.
Classroom management competence	- The competence to lead lectures in the direction of teacher's intentions, and to practice in complex situations. - Classroom management, teacher behavior, aspects of relationships related to teaching and professional ethics.
Competence to use foreign languages and apply information technology in teaching	- Use foreign languages (or ethnic minority languages for teachers working in ethnic minority areas) in professional and educational activities. - Apply information technology in professional and educational activities.
Competence to help colleagues develop their careers	- Build relationships with colleagues and superiors: Building cooperative relationships, supporting colleagues and superiors, creating a cultural environment in the school.

Group of general competencies	Descriptions
Competence to work in groups	- Develop collaboration with colleagues, others, parents and students.
Competence to work in a multicultural environment	- Show passion, inquisitiveness and respect for the behavior, identity and beliefs of other cultures in the process of contacting and exchanging information. - Respect the differences of other cultures.
Competence in counseling and supporting school psychology	- Understand students, advise, guide, care for and support students in the learning process.
Integrated and differentiated teaching competence	- Relate subject knowledge to real-world problems.
Competence to handle pedagogical situations	- Provide flexible handling, while ensuring educational principles and making students trust their teachers.
Competence to organize social activities	- Mobilize in a flexible and organized manner the knowledge, skills, attitudes and feelings of teachers to effectively carry out social activities and achieve educational goals for students.
Competence to assess student learning outcomes	- Design and use tools and methods of student assessment in accordance with regulations, supporting students to progress in the learning and training process. - Systematically assess student learning outcomes, assess the learning and teaching environment, and use the results as a basis for feedback and future lesson planning and development, the possibilities and limitations of assessment and feedback in relation to teaching and learning.
Group of special competencies	
Diagnostic competence	- The competence to detect and recognize fully, accurately and promptly the development of students and the educational needs of each student. This is a particularly important competence because the development of all aspects of students in primary school is very rapid, but uneven.
Responsive competence	- It is the competence to give correct and timely educational contents and measures, suitable to learners' needs and requirements of primary education objectives.
Evaluation competence	- Competence to recognize changes in students' cognitive, behavioral and emotional skills. Evaluation competence helps teachers to confirm the correctness of the diagnosis and response.
The competence to establish favorable relationships with others	- The relationship with colleagues, the relationship with the parents of students and especially the relationship with students.
Competence to implement teaching programs	- The competence to conduct teaching and education; based on the stated purposes and contents of education and teaching, but suitable to the characteristics of the learners.
Competence to respond to social responsibility	- The competence to create favorable conditions for education in school and in life outside of school
Group of professional competencies	
Skills to demonstrate exemplary primary school teachers	- Due to the characteristics of the school level, a primary school teacher, right from the initial contact with students and during a long practice period, always needs to have demonstration skills and exemplariness (attitude, behavior, etc.) behavior…) as one of the conditions for practicing teaching.

Group of general competencies	Descriptions
Pedagogical language skills	- Using language that is pedagogical, simple and clear, suitable for primary school students
Board writing and presentation skills	- Due to the characteristics of primary school teachers compared to teachers of other grades, they must have skills in correct writing, beautiful writing, scientific and aesthetic board presentation in class.
Pedagogical communication skills	- In order to well solve relationships with colleagues, teacher-student relationships, relationships with students' parents, relationships with the social community, and good relations between students in the class.
Educational skills	- The skills to conduct educational activities for students inside and outside of class time.

The primary school teacher's math teaching profile is the basis of competence assessment in the process of teaching math, which can be supplemented or replaced regularly. This is the basis for renewing the primary school teacher training program to meet the current educational program renovation requirements.

2.2. Survey on the development profile of primary school teachers' math teaching competence

The survey was conducted from October to November 2018 at Tan Trao University and Hung Vuong University; Tuyen Quang city and Ha Giang city and primary schools in the district of 3 provinces (Son Duong, Chiem Hoa, Doan Hung, Vi Xuyen). The respondents of the survey are lecturers, administrators, and teachers at these schools.

Table 2.2. Respondents of the survey on primary school teachers' math teaching competence

Respondents of the survey	Tuyen Quang	Phu Tho	Ha Giang
Lecturers	15	5	
Administrators	10	7	8
Teacher	40	20	15

The teacher's competency development profile is one of the important factors in helping teachers realize their existing and potential competencies. In addition, educational administrators help teachers to strive and further develop their competence in the teaching process. In competence assessment in general and in teacher competency assessment in particular, it is difficult to find out which teachers are suitable for certain job requirements if only qualitative methods are used as it is difficult to measure and evaluate the teacher's real competence because the teacher's work has specific characteristics; the purpose of the work is to form and develop the personality of students to meet the requirements of the current general education program.

2.3. The current situation of developing and fostering Math teaching competence for primary school teachers in the integrated teaching approach

According to the results of the survey on 97 teachers and educational administrators at some primary schools about the 9 components of integrated teaching competence for primary school teachers (Appendix 4), the majority of teachers and administrators are concerned about the components at varying degrees (Table 1.3).

The survey results in Table 1.3 show that the majority of teachers and educational administrators are interested in the above 9 components and show the need for fostering this competence.

In order to apply integrated teaching effectively, it is necessary to select the important components of the necessary and possible integrated teaching competence for teachers. On the basis of researching and understanding theoretical issues related to integrated teaching, we selected, rearranged, and surveyed 5 basic components of integrated teaching competence in Mathematics to foster for primary school teachers as follows: (Appendix 5)

1. Competence to plan integrated teaching in Mathematics

2. Competence to design integrated math lessons

3. *Competence to organize integrated Math teaching activities in the classroom*

4. Competence to test and evaluate in integrated teaching of Mathematics

5. Classroom management competence in the process of integrated teaching of Mathematics

Accordingly, component competencies such as *defining goals, connecting lessons with practice, and language competence and cooperation competence* have been integrated into those 5 components.

The results obtained from this survey are consistent with the comments from the statistics in Table 1.3; together with the survey results of the need for fostering the components of integrated teaching competence shown in table 1.4 and chart 1.1, they show that:

+ The 5 selected components have demonstrated to be relatively basic competencies necessary to foster primary school teachers in integrated teaching.

+ Most teachers have a need to foster professional competence, especially integrated teaching competence.

According to the 2018 General Mathematics Education Program, besides implementing intra-subject integration, it also implements interdisciplinary integration through related content and topics or implements the exploitation and use of mathematical knowledge in the curriculum. Subjects. The Math program also implements intra- and interdisciplinary integration through hands-on and experiential activities. At the primary level, the early stage is the beginning of the formation of basic knowledge and skills. For this stage, it is not easy to integrate multiple subjects in the way where students mobilize knowledge of many subjects to solve a certain problem, but the integration method should only stop at the level of topics associated with work, learning with play; teaching knowledge and skills through organizing practical activities and observing reality, etc.

Therefore, in teaching Mathematics in primary schools, teachers can integrate through the form of content development and theme-based teaching for Mathematics. In order to have a practical basis, we conducted a survey on *the awareness and ability* to teach math topics of primary school teachers to teach math topics.

The number of teachers participating in the survey is 35 people, of which 15 are from Hong Thai Primary School and 20 from Phan Thiet Primary School. The number of participating administrators is 30 people. They are teachers who are directly teaching classes of some primary schools in Tuyen Quang city, management staff who are the Principal, Vice Principal, and Head of Department of Primary Schools in Tuyen Quang Province.

2.4. Limitations and difficulties in teaching Mathematics of primary school teachers in the integrated teaching approach

The cause of the above situation may be due to the fact that the professional training for teachers in the integrated teaching approach of schools has not been

focused regularly or has not brought practical effects; it may also be due to the awareness and teaching competence of teachers.

Regarding awareness; qualifications; students' perspectives; the selection of integrated teaching contents:

The above reasons are the basis for proposing measures to develop Math teaching competence for primary school teachers in the integrated teaching approach.

CONCLUSION FOR CHAPTER 2

To meet the requirements of general education reform in 2018, teachers need to be regularly fostered. Regarding the groups of competencies which the thesis proposed, according to the results of the actual investigation, many teachers and administrators make recommendations to improve their own professional skills in order to promote effective relationships with colleagues, parents and other educational forces.

The thesis has developed a profile of developing math teaching competence of primary school teachers, done practical research, conducted expert consultation, proposed groups of general and specific competencies which have been presented in the profile of developing math teaching competence of primary school teachers with specific descriptions for each competency/skill. The teacher's math teaching competence development profile is the basis for assessing the competence in the teaching process, which can be supplemented and replaced regularly. This is the basis for renewing the primary school teacher training program to meet the current educational program renovation requirements. The results of the survey on the current situation of teaching competence in Mathematics for primary school teachers in the integrated teaching approach in some primary schools show that most primary school teachers have a good awareness of the importance of teaching Mathematics in the integrated teaching approach. This is a favorable condition for the school to improve the teaching competence of the teaching staff, helping teachers to perform their teaching tasks well. The awareness, qualifications and competence of teachers when applying integrated teaching methods, integrated teaching contents and the importance of teaching competence in Mathematics in the integrated teaching approach partly affect the quality of teachers' teaching quantity.

The above theoretical and practical bases are solid premise for the thesis researcher in researching and proposing measures to develop Math teaching competence for primary school teachers in the integrated teaching approach.

Chapter 3 - SOME MEASURES TO DEVELOP THE COMPETENCE OF TEACHING MATHEMATICS FOR PRIMARY TEACHERS IN THE INTEGRAL TEACHING APPROACH

3.1. Principles of proposing pedagogical measures

Principle 1: Aim to overcome difficulties and limitations in the practice of teaching and learning Mathematics in Vietnamese Primary Schools.

Principle 2: Ensure the implementation of professional regulations for primary school teachers.

Principle 3: Stick to and base on the researched theory and practice.

3.2. Some pedagogical measures

3.2.1. Measure 1: Fostering awareness and competence to define goals, plan, and design Math lessons in the integrated teaching approach for primary school teachers

3.2.1.1. The premise of the measure:

3.2.1.2. How to implement the measure:

3.2.1.3. Illustration

3.2.2. Measure 2: Fostering the competence to design and create an integrated teaching environment for primary school teachers

3.2.2.1. The premise of the measure:

3.2.2.2. How to implement the measure:

3.2.2.3. Illustration

3.2.3. Measure 3: Fostering the competence of teaching mathematics in the integrated teaching approach for primary school teachers

3.2.3.1. The premise of the measure:

3.2.3.2. How to implement the measure:

3.2.3.3. Illustration

3.2.4. Measure 4: Fostering the competence to assess students' Mathematics learning outcomes in integrated teaching for primary school teachers

3.2.4.1. The premise of the measure:

3.2.4.2. How to implement the measure:

3.2.4.3. Illustration

CONCLUSION FOR CHAPTER 3

On the basis of theoretical research (chapter 1) and practical investigation (chapter 2), in chapter 3 we propose four measures to develop the mathematics integrated teaching competence for primary school teachers.

For each measure, the scientific basis and implementation method are presented along with illustrative examples in teaching Mathematics in primary schools. These measures have a dialectical relationship with each other. When used together, they will support and complement each other in impacting the components of the integrated teaching competence for teachers. Specifically:

Measure 1 is aimed at preparing basic knowledge and skills in setting goals and building integrated teaching content for primary school teachers when planning and designing integrated lessons in Mathematics. It can be seen that this is a measure to create the necessary conditions for teachers in applying integrated teaching to Mathematics, directly overcoming the current difficulties and limitations of teachers.

Measure 2 is aimed at *training teachers in designing activities and creating an integrated teaching environment in Mathematics according to a 6-step process.* This measure is meant to help teachers synchronize *contents, techniques and teaching methods* in an integrated teaching and learning environment; At the same time, it also affects *teachers' language* competence, *cooperation* competence *and their competence to connect* lessons with practice.

Measure 3 directly *trains teachers to organize and conduct integrated teaching activities in Mathematics.* This measure plays a central role, demonstrating the ability of each teacher to operate and organize integrated teaching in the classroom after designing and creating an integrated environment in the scenario of the lesson plan. On the other hand, this measure also affects the *teachers' language* competence, *cooperation* competence *and their competence to connect* lessons with practice *and assessment.*

Measure 4 directly affects teachers' competence to *evaluate students' math learning outcomes* in an integrated teaching environment. It can be said that this measure helps teachers to assess how the effectiveness of integrated teaching in Mathematics affects students' math learning results, thereby helping them to adjust their scenarios as well as their integrated teaching methods. At the same time, it also demonstrates the competence to *compare the results of the integrated teaching process with practice.*

Thus, the way to solve the problem posed in the thesis topic has been shown in the solution of 4 measures to affect the components of the integrated teaching competence in Mathematics for primary school teachers, contributing to overcoming the difficulties and limitations analyzed in Chapter 2 on the *development of integrated teaching competence* for primary school teachers.

Chapter 4 - PEDAGOGICAL EXPERIMENT

4.1. Purposes and tasks of pedagogical experiment

Pedagogical experiment is to evaluate the feasibility and effectiveness of measures to develop competence for primary school teachers in teaching Mathematics in the integrated teaching approach. Controlled testing is performed on two bases:

+ Results of teacher training.

+ The teacher's integrated teaching results are based on the learning outcomes of primary school students.

4.2. Experiment participants

Primary school teachers; Students in grades 4 and 5 of 3 schools in Tuyen Quang province, including Y La Primary School, Tuyen Quang City, Cap Tien Primary School in Son Duong District, Kim Binh Primary School in Chiem Hoa District.

4.3. Experiment contents

4.3.1. For teachers

Training for teachers in 3 topics including: *Topic 1: General issues of integrated teaching; Topic 2: Designing and organizing teaching by integrated themes in primary schools; Topic 3: Professional competence development for primary school teachers through lesson study.*

4.3.2. For students

Illustrated lessons in 2 classes/schools

4.4. Organization of the experiment

Organize an experimental group of primary school teachers from 3 standard primary schools: Y La Primary School; Cap Tien Primary School; Kim Binh Primary School. Specifically:

Y La Primary School: Including Grade 4 (3 classes with a total of 118 students); Grade 5 (3 classes total 122 students); teachers in Grades 4 and 5 who have a university degree and have worked for at least 15 years and 25 years at most.

Cap Tien Primary School: Including Grade 4 (4 classes with a total of 116 students); Grade 5 (4 classes total 109 students); teachers of Grades 4 and 5 who have a college degree or higher and have worked for at least 5 years and 15 years at most.

Kim Binh Primary School: Including Grade 4 (4 classes with a total of 95 students); Grade 5 (5 classes total 103 students); teachers of Grade 4 and 5 who have a college degree or higher and have worked for at least 7 years, and at most 20 years.

+ Organizing 1 control class and 1 experiment class of students

+ Experiment time:

Phase 1: Training for primary school teachers and administrators

- Y La Primary School: From July 1, 2018 to July 7, 2018
- Cap Tien Primary School: From July 8, 2018 to July 10, 2018
- Kim Binh Primary School: From July 11, 2018 to July 13, 2018

Phase 2: Teaching practice of primary school teachers and learning outcomes of primary school students

- Y La Primary School: From August 1, 2019 to August 6, 2019 for 2 grades 5
- Cap Tien Primary School: From August 7, 2019 to August 13, 2019 for 2 5th graders.
- Kim Binh Primary School: From August 14, 2019 to August 20, 2019 for 2 grades 4.

4.4.1. Experiment organization phase 1

4.4.2. Experimental organization for the 2nd phase

4.5. Evaluation of the experiment results

Pedagogical experiment phase 1:

- General comments:

+ Advantages:

• Classes and conditions for training and retraining are generally good.

• Training courses and fostering courses are organized mainly in the form of training through group activities.

• Activities of trainers and trainees are in the approach of organizing and implementing fostering activities, ie fostering through experiential activities of trainers and trainees; paying attention to the role of individual trainees, groups and classes in the training process.

• Carry out assessment in the training and fostering classes in general in accordance with the requirements, which has encouraged and promoted trainees' active participation in activities without disturbance.

• The training and fostering courses all achieved the set goals. Through the process of training, teachers' understanding and practical skills of applying integrated teaching in Mathematics with some other subjects have witnessed remarkable progress.

+ Disadvantages: Despite the positive results, we find that there are limitations in the competence development of primary school teachers in integrated teaching of Mathematics. For teachers, evaluating students' results is as difficult as evaluating through observation and through the results reported by each group.

The experimental results of the first phase show the pedagogical intention for teachers to familiarize themselves with the development of lesson plans and integrated teaching practice. However, the quality of integrated teaching also depends on many other factors such as teaching contents, students, media and teaching environment, etc.

Obviously, for teachers to be able to understand and apply integrated teaching of Mathematics, there must be a sufficient period of time. Therefore, together with the teachers, we evaluated, learned from experience, and adjusted the Math integrated teaching plan to overcome those limitations in the second phase of the experiment.

Pedagogical experiment phase 2:

Results of assessing the competence development of primary school teachers participating in the integrated teaching experiment for after 6 weeks of teaching according to the measures (proposed in chapter 3), and according to the evaluation criteria of Integrated teaching competence (identified in chapter 1) are as follows:

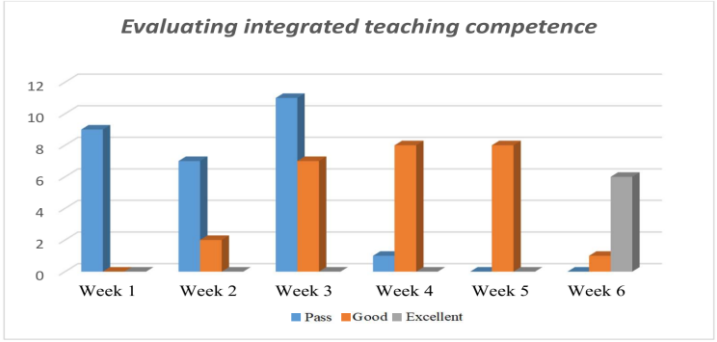

Figure 4.3. Results of evaluating integrated teaching competence of teachers at Y La Primary School

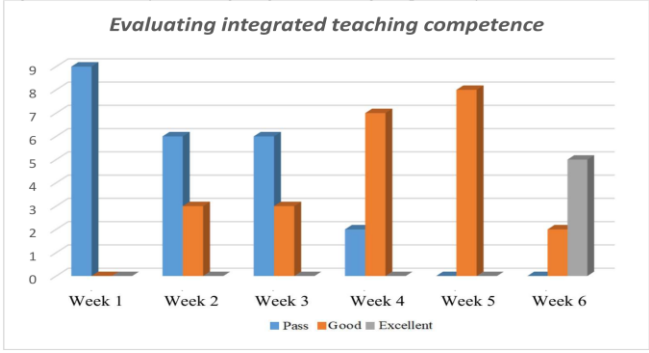

Figure 4.4. Results of evaluating integrated teaching competence of teachers at Cap Tien Primary School

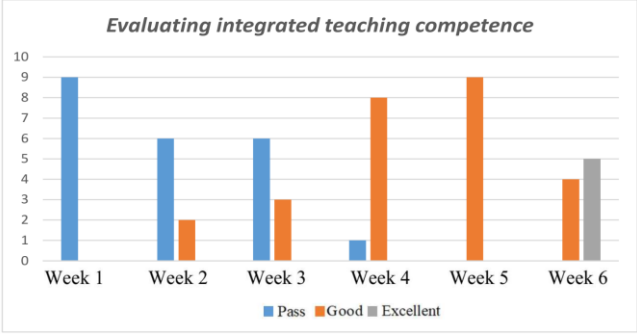

Figure 4.5. Results of evaluating integrated teaching competence of teachers at Kim Binh Primary School

For students:

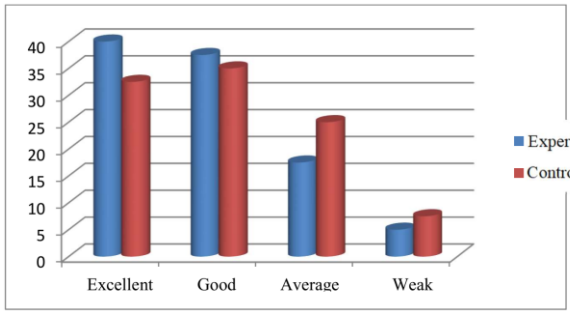

Figure 4.6. Frequency (classification) of students' scores at Y La Primary School

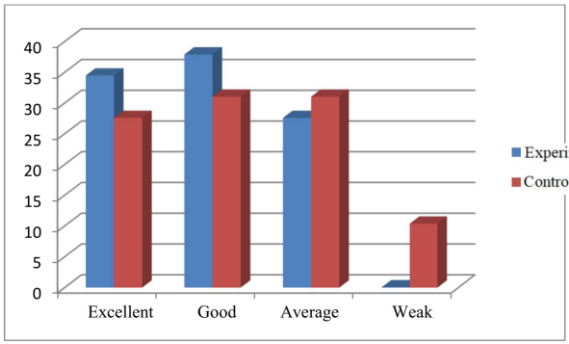

Figure 4.7. Frequency (classification) of students' scores at Cap Tien Primary School

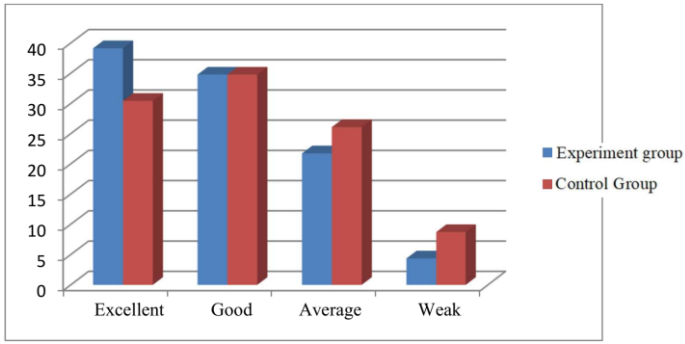

Figure 4.8. Frequency (classification) of students' scores at Kim Binh Primary School

CONCLUSION FOR CHAPTER 4

After determining the purposes, objects, and methods of pedagogical experiment, the researcher of the thesis conducted a pedagogical experiment at Y La Primary School, Cap Tien Primary School, and Kim Binh Primary School, which has partly met the requirements of the current teaching method innovation orientation.

The researcher of the thesis has conducted the experiment based on the contents that has been developed and conducted training for experimental teachers on these contents. After the training, the researcher of the thesis developed lesson plans and sent them to the experimental teachers. Through the training process, the teachers in the experimental group have initially prepared an integrated math lesson plan, compared the lesson plans and teaching sessions before and after the experiment. Although all teachers have a degree from a College of Education or higher, when being assessed on the competence by the criteria to assess the level of teaching competence development of primary school teachers in integrated teaching of Mathematics, the teachers only got pass level scores. Thus, it is not easy to develop Mathematics integrated teaching competence. In addition, the researcher of the thesis evaluated the results of integrated teaching of teachers based on the learning results of primary school students through tests. The collected data has been processed according to the manipulations of the action research method. The obtained results show the feasibility and effectiveness of the proposed measures.

With the results obtained and the data processed from the survey-observation method, the case study method, the theoretical research method, there is a basis to draw the following conclusions: Some of the necessary integrated teaching competencies of teachers in teaching Mathematics can be formed and developed through the proposed measures. These pedagogical measures not only help teachers develop teaching competence but also help students learn more actively, become more self-disciplined, and better achieve teaching goals. Besides the obtained results, there are still some difficulties when conducting the experiment: The experimental time is not long, the formation and development of teaching competence for teachers depends on the number of times and the frequency of implementing measures to practice those skills; the task to be completed by the experimental teacher is quite large, so it requires high efforts of each teacher. Due to the limited time, the thesis only conducted training for a few teachers to help them conduct experimental teaching to verify the feasibility of the proposed measures.

However, the purpose of the experiment has been completed; the proposed pedagogical measures are feasible and effective.

CONCLUSION

The thesis has obtained the following main results:

1) An overview of the situation and research results on integrated teaching in general and integrated teaching in Mathematics in particular. Research results show that integrated teaching (in general) has appeared very early, but only since the appearance of the teaching method that integrates subject contents in many countries has it become more theoretically grounded and more effective.

2) Research on practice in countries using integrated teaching methods shows that the integrated teaching of some subjects in primary schools has been and is being applied by many countries around the world, especially in the current era of flat world and 4.0 technology. To conduct effective integrated teaching, it is necessary to smoothly integrate the content of Mathematics with a number of other subjects. Therefore, the method of integrated teaching in Mathematics is correct and appropriate.

3) On the basis of clearly defining the characteristics of Mathematics in primary school, the researcher of the thesis has proposed an integrated teaching competency framework, based on the specific elements and criteria for each element. This competency framework will support the actual survey of the competence of Math teachers in the integrated teaching approach, serve as orientation for proposing measures to develop Math teaching competence for teachers in primary schools, and serve as the basis for assessing the development of math teaching competence of teachers.

4) The thesis has proposed four measures to develop math teaching competence for teachers in primary schools. Each measure has a purpose, scientific basis and specific implementation techniques.

5) To assess the competence development for teachers in primary schools, the researcher of the thesis has proposed measures based on theoretical research results and practical situation in Vietnam.

6) The results of pedagogical experiments, which are based on a number of lessons according to the proposed measures and based on the results of a case study on a group of primary school teachers, show that the measures proposed by the thesis have the potential to be feasible and effective. The above results prove that the proposed scientific hypothesis is acceptable, the research tasks have been completed.

The results of this thesis can be applied in practice in Vietnam. In particular, some products of the thesis can effectively serve teachers and students in primary school teacher training institutions to meet the current requirements of general education innovation.