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TRAINING LESSON PLAN DESIGNING SKILLS FOR MATHEMATICS TEACHER EDUCATION STUDENTS TOWARDS THE DEVELOPMENT OF STUDENTS' QUALITY AND COMPETENCE

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ABSTRACT

In order to teach towards the development of students' quality and competence, it is essential to design a teaching plan in this direction first. In particular, each teacher education student, each future teacher also needs to be trained in designing lesson plans towards the development of students' quality and competence. In this article, based on the research results on the teaching skills that need to be trained for students and the skill training process, we propose a process to practice the skills of designing mathematics lesson plans towards the development of quality and competence for mathematics teacher education students.

KEYWORDS: Teaching skills, lesson plan, mathematics teacher education students

I. STATEMENT OF THE PROBLEM

Teaching towards the development of students' quality and competence is one of the requirements of today's education. This way of teaching aims to help students see the "meaning of learning", know how to apply the knowledge and skills learned in school to solve real-life problems. To teach in this direction, teachers must have pedagogical skills in which designing lesson plans towards the development of students' quality and competence is an important skill that contributes to the success of teaching towards the development of students' quality and competence. Responding to the requirements of educational innovation, university students are now focusing more on training professional skills for teachers because teaching is a profession that requires many skills (*skills of learning programs and textbooks, skills of designing mathematics lessons, skills of applying teaching methods in teaching mathematics, skills of using means and applications of information technology in teaching, skills of solving mathematics problem, skills of evaluating learning results in mathematics...*). These skills need to be formed and trained for teacher education students. Within the scope of this article, we mention one of the fundamental skills that need to be trained for mathematics teacher education students so that after graduation, they will have the ability to organize teaching towards the

development of students' quality and competence. That skill is "*The skill of designing lesson plans towards the development of students' quality and competence*".

II. Research content

2.1 Overview of teaching skills that need to be trained for mathematics teacher education students

2.1.1 Some teaching skills of mathematics teachers

According to Xavier Roegiers (1996), "*Teaching skill refers to the ability to effectively perform several operations or a series of operations of a teaching action*".

Based on the results of a general study of a number of standards on mathematics teacher education in some countries around the world and in Vietnam, it can be seen that most countries have set the criteria that teachers need to know how to teach students how to learn, how to think and how to do. Specifically, according to Dao Tam (2015), *the teacher's role in teaching is asking questions, listening, and checking, while the student's role is active and interactive - listening and answering but also asking to explore and debate*. In the article "Necessary skills of mathematics teachers in the current period" (2015), Cao Thi Ha proposed some teaching skills, such as *skills of studying programs and textbooks, skills of planning and teaching, skills of designing lesson plans...* Besides, the author also proposed the teaching skills for mathematics teachers, including the skill of creating a learning environment for students during the class process, the skill of presenting tables and using teaching aids for mathematics, skills of setting and solving problems in teaching mathematics, skills of organizing individual activities, group activities, collective activities for students, skills of building an online learning environment for students, skills of solving mathematics exercises, skills of designing teaching aids for mathematics and skills of applying mathematics in other subjects and life.

2.1.2. The skill requirements need to be prepared for mathematics teacher education students

One of the characteristics of studying at university is vocational training. To become a good and skilled teacher, a student must be trained "vocationally" and must have the necessary skills for later teaching while they are still in the university of education. Therefore, each student needs to practice and develop skills to achieve output standards and meet professional standards.

According to the research results of domestic and foreign authors, by referring to the output standards for mathematics teacher education students, it can be seen that the requirements for professional skills of mathematics teacher education students include teaching skills, education skills and professional development skills. In order to teach mathematics well after graduation, each student needs to be prepared with minimum teaching skills through blocks of professional knowledge.

The necessary teaching skills for mathematics teacher education students have also been studied in many countries. The Association of Mathematics Teacher Educators (AMTE) provides essential

preparation for future mathematics teachers including *understanding mathematics knowledge for each grade, understanding mathematics teaching knowledge and skills, understanding how students learn mathematics and understanding the impact of the social community on teaching mathematics.*

In Vietnam, the teaching skills that need to be prepared for mathematics teacher education students have also been reflected in *the output standards of universities that train teachers.* When summarizing the research results, we have identified the skills that need to be prepared for mathematics teacher education students, according to the progress of teaching, including:

Skills needed to be prepared for mathematics teacher education students

No.	<i>Skills needed to be prepared for mathematics teacher education students</i>	
1	The skill of preparing the lesson	<ul style="list-style-type: none">- Skill of studying programs and textbooks.- Skill of designing the lesson plan (curriculum).- Skill of solving mathematics exercise.- Skill of designing/preparing teaching aids.
2	The skill of performing the lesson	<ul style="list-style-type: none">- Skill of presenting on the board (writing, drawing, ...)- Skill of using language to help students understand the meaning in the content of mathematics.- Skill of applying teaching methods in mathematics.- Skill of using teaching aids in mathematics.- Skill of applying mathematics in practice and life.
3	The skill of assessment	<ul style="list-style-type: none">- Skill of evaluating students' mathematics learning results.- Skill of evaluating summaries and feedback.- Skill of progress assessment and feedback.

2.1.3. Training teaching skills for mathematics teacher education students

According to X.I Kixengoph, the process of forming students' teaching skills consists of 5 stages: (1) Introduce students to the content and how to perform activities that they will have to perform; (2) Present to students about the rules of acquiring or reproducing the knowledge, experience, etc., the

basis of the skills that will be formed; (3) Present a sample action for students to observe with the aim of forming a clear and complete representation of the action for them; (4) Organize for students to practice according to model activities. After this period, students have skills to perform specific activities but are still independent and not linked together; (5) Put the formed independent skills into practice so that they are linked together into a system. At the end of this stage, students have vocational skills at a basic and minimum level to perform pedagogical activities.

University education students are those who are prepared to work in the field of education. They are those who are apprentices in teaching. In a specific case, mathematics teacher education students are apprentices who teach mathematics in schools. Therefore, right from the time students are studying at a university of education, they need to practice professional skills in general and teaching skills in particular. On the basis of understanding the framework of the bachelor's degree program in mathematics teacher education of some universities of education in Vietnam, it can be seen that most of the programs are divided into 3 blocks of knowledge, including general knowledge, specialized knowledge and professional knowledge. In particular, most of the professional knowledge block focuses on training teaching skills. Although there have been changes, in general, the framework of training programs of universities of education has consciously equipped students with the necessary knowledge and skills to prepare teachers in the future. In particular, the skill of designing mathematics lesson plans towards the development of students' quality and competence needs to be paid attention and updated in the training program to help students after graduation to meet the requirements of employers and apply their knowledge into practice.

2.2 Training mathematics teacher education students in designing lesson plans towards the development of students' quality and competence

2.2.1 The structure of the mathematics lesson plan towards the development of students' quality and competence

The quality and competence of students can only be formed and developed through "doing", through activities. Therefore, with the teaching model towards the development of students' quality and competence, educational researchers encourage teachers to use a teaching style that includes the following activities: (i) Experiencing, (ii) Analyzing, discovering and forming knowledge, (iii) Consolidating and practicing, (iv) Applying knowledge and skills into practice. Accordingly, the structure of the mathematics lesson plan towards the development of students' quality and competence includes:

School.....	
Department.....	
Date.....	
	NAME OF THE LESSON.....
I. Objectives	
1. Qualities	
2. Competencies	
II. Teaching equipment and learning materials	
III. Teaching procedure	
1. Identify the problem (experience)	
2. Form knowledge	
3. Practice	
4. Apply	

In the objectives section, it is necessary to define and clearly describe the qualities and competencies that through the lesson students can form and develop. In the teaching equipment and learning materials section, it is essential to identify the teaching devices used in the lesson to organize learning activities to achieve the objectives. Based on the objectives and content of the lesson, the teacher determines the sequence of activities for the lesson. For each activity, the teacher needs to research to determine the content of the activity, how to conduct the activity as well as a plan to test and evaluate the student's performance.

2.2.2 The process of designing lesson plans towards the development of students' quality and competence

The teaching situation towards the development of students' quality and competence initially shows that teachers will be more successful in organizing teaching towards the development of students' quality and competence if they are well prepared from the stage of designing lesson plans. To design a lesson plan towards the development of students' quality and competence, it is necessary to follow the following steps:

Step 1: Study textbooks and related documents to understand the exact content of the lesson, determine the qualities and competencies that can be formed and developed for students, and determine the logical sequence of the lesson. The reading of textbooks and materials for designing lesson plans can be divided into three levels: *skimming* to find the main content and identify basic knowledge, skills, requirements and scope to be achieved; *read to find information of interest*, knowledge circuits, skills and intentions of the author; *read to detect, analyze and evaluate* details corresponding to knowledge and skill circuits.

Step 2: Determine the lesson objectives

This step is set out because determining the lesson objectives is a very important step. It plays the first and indispensable role in each lesson plan. An objective is both a goal and a requirement to be achieved. In other words, it is a measure of the results of the teaching process. Based on the

requirements of the lesson, the content of knowledge, the means, equipment, forms, methods, and techniques of teaching, teachers can define quality objectives, general competencies and specific competencies. Based on the research results in step 1, teachers need to answer the following questions: What qualities and competencies do students obtain after this lesson? What qualities and competencies are students trained and developed through each question and exercise? What qualities and competencies will have the opportunity to form and develop in students with the expected forms, methods and techniques of teaching?

Step 3: Design learning activities

In order to design learning activities to meet the objectives in accordance with the conditions of teaching means and equipment as well as teaching forms, methods and techniques, and expected methods of testing and evaluation, teachers first identify the content of the activity, anticipate the student's "learning" product when performing the activity, then design a process to perform the activity, according to which students perform the activity (individual, pair, group...). How do teachers organize, guide and control the students' activities? In what form will the student's "learning" product be reported, tested and assessed? Finally, teachers need to "conclude" the next learning issues and tasks.

Step 4: Finalize the lesson plan

After the lesson plan has been compiled, teachers need to conduct a review to see if the lesson objectives have met the requirements. Teachers also need to consider the appropriateness between the objectives and the sequence of teaching activities, the suitability between teaching methods and teaching aids in each activity, the suitability of the test and assessment plans, the link among activities in the lesson plan as well as the variety of activities.

2.2.3 The process of training the skills of designing mathematics lesson plans towards the development of students' quality and competence for mathematics teacher education students

On the basis of research on teaching theory towards the development of students' quality and competence, the structure and characteristics of the teaching plan towards the development of students' quality and competence and materials on training teaching skills, we offer a training process for mathematics teacher education students to design mathematics teaching plans towards the development of students' quality and competence as follows:

Step 1: Lecturers describe the structure and process of designing lesson plans towards the development of students' quality and competence. For example, lecturers introduce the content 2.2.1 and 2.2.2

Step 2: Lecturers let students research a mathematics lesson plan towards the development of students' quality and competence then discuss and analyze the structure of the lesson plan. Accordingly, based on the requirements of the lesson, the content of the lesson, the teaching methods and techniques shown in the lesson plan, lecturers guide students to analyze the following points: i) Are the objectives of the

lesson reasonable? Apart from the identified qualities and competencies, do you have anything to add? Why? (ii) Are the activities designed to meet the objectives? (iii) How will you adjust the objectives if necessary? Why?

With this activity, students will better understand how to design lesson objectives as well as how to design content activities.

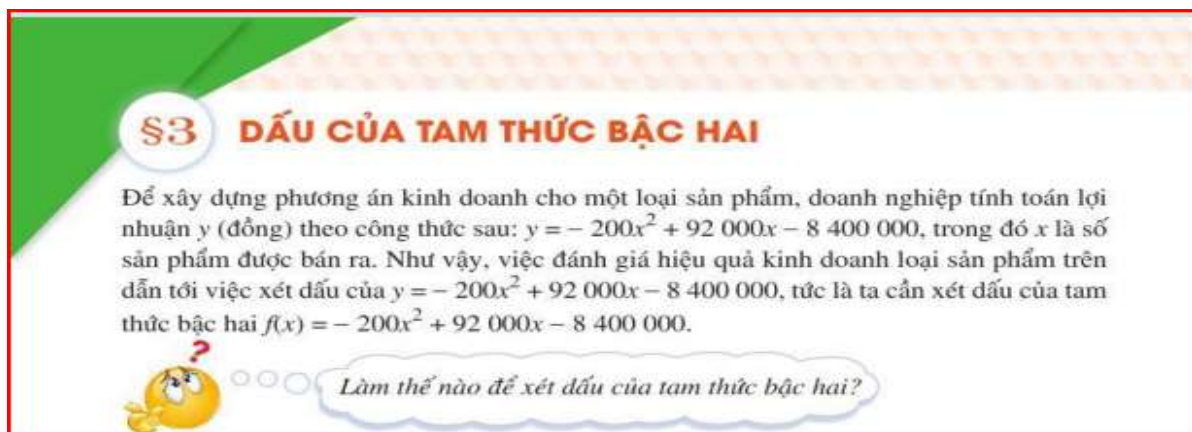
Step 3: Students practice designing teaching plans towards the development of students' quality and competence. Lecturers assign tasks to students or groups of students to design their own mathematics lesson plans towards the development of students' quality and competence in accordance with the structure and process that lecturers have introduced.

Step 4: Lecturers discuss with students and require them to edit and present their individual (or group's) "learning" work.

Due to the limited scope of the article, we only present an illustrative example for determining the objectives of the lesson plan.


Example: Students design a teaching plan for the lesson: "*Factoring quadratic trinomial - Mathematics 10*"

Based on the requirements of the lesson: "*Explain the theorem about factoring quadratic trinomial from observing the graph of the quadratic function*" and the lesson content has questions and exercises related to the practical problems to be solved. Such as:



§3 DẤU CỦA TAM THỨC BẬC HAI

Để xây dựng phương án kinh doanh cho một loại sản phẩm, doanh nghiệp tính toán lợi nhuận y (đồng) theo công thức sau: $y = -200x^2 + 92\,000x - 8\,400\,000$, trong đó x là số sản phẩm được bán ra. Như vậy, việc đánh giá hiệu quả kinh doanh loại sản phẩm trên dẫn tới việc xét dấu của $y = -200x^2 + 92\,000x - 8\,400\,000$, tức là ta cần xét dấu của tam thức bậc hai $f(x) = -200x^2 + 92\,000x - 8\,400\,000$.

 Làm thế nào để xét dấu của tam thức bậc hai?

Students identify two component competencies that can be formed and developed, namely *mathematical communication competence* and *mathematical modeling competence*.

In addition, the teaching methods and techniques that students determine to use when teaching this lesson is cooperative teaching with the tablecloth technique. Therefore, the qualities that the lesson helps students to form and develop students are *honesty*, *responsibility* and *studiousness*.

Specifically, the lesson objectives are defined as follows:

FACTORIZING QUADRATIC TRINOMIAL

I. OBJECTIVES

1. Competencies

- **Mathematical modeling competence:** Students can set up the problem “factoring quadratic trinomial” to solve the practical situation of “negative profit” and “positive profit”. Students can apply the rule of factoring quadratic trinomial to solve practical problems.

- **Mathematical communication competence:** Students can understand the quadratic trinomial based on its graph, explain the quadratic trinomial from observing the graph of the quadratic function. Students are able to confidently present the results of the group’s discussion, report and discuss the “learning” product.

2. Qualities

- **Studiosness:** Students complete the learning tasks given by teachers. Students consciously apply knowledge of “factoring quadratic trinomial” to solve practical problems.

- **Honesty:** Students accurately report the group’s performance results and assess other teams’ results.

- **Responsibility:** Students take responsibility when performing assigned tasks.

III. CONCLUSION

In order to meet the requirements of educational innovation which is to switch from teaching with a content approach, mainly transferring knowledge, to teaching towards the development of students’ quality and competence, teacher education students in general and mathematics teacher education students in particular need to be prepared with basic and necessary skills right from the time they are in university. In this article, we have summarized the skills that need to be trained for mathematics teacher education students, thereby identifying the skills of designing lesson plans towards the development of students’ quality and competence. We have described the structure as well as identified the process of designing mathematics lesson plans towards the development of students’ quality and competence. We have built a process to practice the skills of designing lesson plans in this direction for mathematics teacher education students. In the following studies, we will continue to study other skills that need to be trained for mathematics teacher education students so that after graduation, they will be able to organize teaching towards the development of students’ quality and competence.

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