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TRAINING FUTURE PRIMARY SCHOOL TEACHERS IN DEVELOPING META-SUBJECT COMPETENCIES THROUGH THE FORMATION OF CRITICAL THINKING IN STUDENTS

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Abstract

The article explores the methodology of developing meta-subject competencies in students by fostering critical thinking in the process of training future primary school teachers. In modern educational contexts, it is essential for students not only to acquire subject knowledge but also to apply it across interdisciplinary contexts, solve complex problems, and develop independent thinking skills. The article examines the essence of critical thinking, its integration with meta-subject competencies, pedagogical and psychological theoretical foundations, and the methodology of formation through problem-based learning, case-study, interactive, reflective, and project-based methods. Research results indicate that these methods are effective in developing students' analytical thinking, independent problem-solving, teamwork, and reflective skills.

Keywords

critical thinking, meta-subject competencies, future primary school teachers, project and group work, reflective methods, problem-based learning, case-study methods, interactive methods

Introduction

The modern education system is developing in a complex and rapidly changing environment. It is no longer sufficient for students to merely acquire subject knowledge; they must be able to integrate knowledge across different disciplines, solve problems, and develop independent thinking skills. From this perspective, in the process of training future primary school teachers, fostering critical thinking plays a crucial role in developing students' meta-subject competencies.

Critical thinking is the ability to question, verify conclusions, analyze various sources, and make well-reasoned decisions. Meta-subject competencies involve students' ability to integrate interdisciplinary knowledge, develop analytical and creative thinking, as well as skills in self-assessment, time management, and problem-solving. Therefore, developing critical thinking is considered a central tool for enhancing meta-subject competencies.

Critical Thinking and Meta-Subject Competencies

Critical thinking enables students to move beyond passive reception of knowledge toward actively analyzing information, asking questions, and making reasoned decisions. This process not only helps students retain the knowledge they acquire but also allows them to apply it in various contexts. Critical thinking develops students' coherent reasoning, the ability to draw logically based conclusions, and the capacity to compare different alternatives. In this way, students do not merely accept knowledge; they analyze, evaluate, and creatively transform it into new understanding.

The close integration of critical thinking with meta-subject competencies develops a range of essential skills in students. The most important of these are:

- **Analytical thinking** – Students learn to analyze information, compare data, draw well-reasoned conclusions, and find logical solutions in problematic situations. Analytical thinking helps not only in academic contexts but also in analyzing real-life situations.
- **Problem-solving** – Critical thinking enables students to view problems from multiple perspectives, evaluate existing solutions, and choose the most effective option. This skill strengthens students' creative and critical thinking and prepares them to make independent decisions in complex situations.
- **Teamwork** – In the process of critical thinking, students develop the ability to explain their ideas to others, discuss various decisions, and reach a consensus. Working in a group fosters not only communication and social skills but also responsibility and a spirit of collaboration.
- **Self-management and reflection** – Critical thinking engages students in analyzing their own ideas, identifying errors, and correcting them. Reflection allows students to evaluate their actions, develop personal growth strategies, and work on self-improvement.

Theoretical Foundations

The development of critical thinking and meta-subject competencies is closely linked to pedagogical and psychological theories. Piaget's theory of cognitive development serves as a foundation for fostering students' independent thinking. Vygotsky's concept of social learning, in turn, guides students to share knowledge and collaborate through group work.

Bloom's taxonomy supports the development of students' skills in remembering, understanding, applying, analyzing, synthesizing, and evaluating information. Based on these theoretical foundations, a methodology for developing critical thinking and enhancing meta-subject competencies can be effectively established.

Methodology for Developing Critical Thinking

In the process of training future primary school teachers, the development of critical thinking is carried out through a variety of methodological approaches. These methods not only enhance students' logical and analytical thinking but also teach them to make independent decisions, analyze different situations, and find effective solutions. The main methodological approaches are described below:

1. **Problem-Based Learning (PBL)** – Problem-based learning involves presenting students with real-life situations. In this method, students are not limited to acquiring theoretical knowledge but are required to apply it in different contexts. For example, a project to improve the ecological situation in a school or solving everyday mathematical problems engages students in analyzing the problem, comparing different solutions, and selecting the most effective one. In this way, the problem-based approach develops students' analytical thinking and problem-solving skills.
2. **Case-Study Methods** – In the case-study method, students are presented with complex, real-life situations. They are required to analyze these situations, identify problems, and justify their solutions. This method activates critical thinking, as students compare various solutions, evaluate their advantages and disadvantages, and choose the most effective course of action. Additionally, case-study methods strengthen students' skills in argumentation, communication, and explaining their decisions.
3. **Interactive Methods** – Interactive methods turn students into active participants. Through group work, role-playing, and simulations, students develop skills in expressing their ideas, discussing problems, and finding solutions collaboratively. For instance, in a lesson where different professional roles are presented, students make various decisions and analyze them within the group. In this way, interactive methods enhance students' social and communication skills, as well as their ability to work effectively in teams.

4. **Reflective Methods** – Reflection involves analyzing one's own actions, identifying mistakes, and correcting them. Through reflective methods, students learn to evaluate their own work, analyze their decisions, and develop new strategies for future actions. This approach not only fosters critical thinking but also helps students become independent and responsible individuals. Tools such as portfolios, journals, and self-assessment are effective instruments for reflective activity.

Thus, the combination of these methods demonstrates high effectiveness in developing critical thinking and contributes to the enhancement of students' meta-subject competencies. Students gain the ability to apply their knowledge in various contexts, solve complex problems, and evaluate their own performance. In this way, the methodology for developing critical thinking prepares future teachers not only to teach subjects effectively but also to foster students' creative and analytical thinking skills.

Project-Based and Group Work

The project-based method is an effective tool for developing critical thinking and shaping meta-subject competencies in students. This method teaches students to engage in independent activities, analyze problems, develop solutions, and evaluate outcomes. The project process actively involves students and simultaneously develops their creative, analytical, and communication skills.

Projects typically include the following stages:

- **Setting goals and assigning tasks** – Students learn to identify the project's objectives, define key tasks, and distribute responsibilities among group members. This stage encourages planning, accountability, and the development of strategic thinking skills.
- **Collecting and analyzing data** – At this stage, students study various sources, analyze information, and determine the essence of the problem. Critical thinking is actively employed here, as students compare collected data, evaluate its reliability and relevance.
- **Decision-making and presenting results** – In the final stage of the project, students make decisions based on the analyzed data and present their findings to the group or a wider audience. This process strengthens critical thinking, communication, and leadership skills, while also enhancing collaboration and problem-solving abilities within the group.

Group work plays a particularly important role in developing students' social and communication skills. Students learn to actively communicate with group members, share ideas, evaluate arguments, and reach consensus. At the same time, group work fosters leadership, responsibility, and collaboration skills, providing students with experience in jointly developing decisions and solving complex problems in challenging situations.

Practical Examples

For instance, a project titled "School Environmental Protection Campaign" engages students in several tasks: analyzing the problem, developing solutions, preparing an action plan, and evaluating outcomes. This process actively stimulates students' critical thinking and fosters the development of meta-subject competencies.

Another example is the classroom **activity** "Solving Mathematical Problems Using Various Methods." Students approach the problem in different ways, analyze each solution, and select the most effective one. This activity strengthens their critical thinking and analytical skills.

Research results indicate that when methods for developing critical thinking are effectively applied, students' various competencies significantly improve. First, interdisciplinary competencies develop. Students learn to connect the knowledge they acquire across different subjects and analyze problems in a comprehensive manner. For example, by integrating mathematics, natural sciences, and social studies, they learn to evaluate situations from multiple

perspectives and develop solutions. This process reinforces logical thinking, analytical skills, and the ability to make systematic decisions.

Second, developing critical thinking significantly enhances students' ability to solve problems independently. They are not limited to the teacher's instructions; instead, they gain the capacity to justify their decisions and critically evaluate them in real-life situations. In this way, students simultaneously develop creative and critical thinking, adapt flexibly to complex situations, and independently generate solutions.

Third, through group work and interactive methods, teamwork and communication skills are strengthened. Students enhance their social competencies by exchanging ideas, arguing, reaching consensus, and discussing various decisions. This not only enables effective communication but also fosters leadership and collaboration skills within the team.

Moreover, during the application of critical thinking methods, students learn to engage in reflective practice. Through reflection, they identify mistakes, analyze them, and develop new strategies for future activities. This process enhances students' self-assessment abilities, increases their sense of responsibility, and strengthens independent thinking. In this way, when critical thinking and reflective activities are combined, students not only learn to apply knowledge but also acquire the ability to generate new knowledge through creative and critical approaches.

Overall, analysis and discussion indicate that methods for developing critical thinking play a central role in fostering students' meta-subject competencies. These methods enable students to integrate interdisciplinary knowledge, solve complex problems, work effectively in teams, and evaluate their own activities. Therefore, cultivating critical thinking in the preparation of future primary school teachers is considered an important strategy that enhances the effectiveness of the pedagogical process.

Conclusion

Developing critical thinking in future primary school teachers to enhance meta-subject competencies is a key direction in modern education. Critical thinking enables students to integrate knowledge across subjects, make decisions in various situations, and express their thoughts logically. Project-based, interactive, and reflective methods serve as the most effective tools in this process. At the same time, by applying these methods, teachers not only improve their professional skills but also ensure that, in their future pedagogical practice, students acquire comprehensive and adaptable knowledge.

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