

## MECHANISMS FOR FORMING COGNITIVE COMPETENCIES OF FUTURE PRIMARY SCHOOL TEACHERS IN AN INNOVATIVE PEDAGOGICAL ENVIRONMENT

Akram R. Buvrayev

Lecturer, Jizzakh State Pedagogical University  
<https://doi.org/10.5281/zenodo.20073483>

**Abstract:** This article explores the theoretical and practical foundations of forming cognitive competencies in future primary school teachers within an innovative pedagogical environment. The study analyzes the role of integrative approaches, interactive technologies, and interdisciplinary learning in enhancing cognitive development. The results of experimental work demonstrate that the implementation of innovative pedagogical strategies significantly improves students' analytical thinking, problem-solving abilities, and reflective skills.

**Keywords:** cognitive competence, innovative pedagogy, primary education, integrative approach, interactive methods, teacher training, cognitive development.

### Introduction

The rapid development of digital technologies and globalization processes has led to significant transformations in the education system. In this context, the preparation of future primary school teachers requires not only subject knowledge but also well-developed cognitive competencies, including critical thinking, problem-solving, analytical reasoning, and reflective abilities.

Primary education plays a crucial role in shaping the intellectual and personal development of learners. Therefore, teachers working at this level must possess advanced cognitive skills and be able to apply innovative teaching strategies effectively. Traditional teaching approaches are gradually being replaced by innovative pedagogical environments that promote active learning, creativity, and interdisciplinary integration.

An innovative pedagogical environment creates favorable conditions for developing cognitive competencies by integrating modern technologies, interactive teaching methods, and learner-centered approaches. However, the mechanisms for effectively forming these competencies in future teachers remain insufficiently explored, which determines the relevance of this study.

The purpose of this research is to identify and substantiate the mechanisms for developing cognitive competencies of future primary school teachers within an innovative pedagogical environment.

### Literature Review

The concept of cognitive competence has been widely studied in psychological and pedagogical research. Scholars such as J. Piaget, L. Vygotsky, and J. Bruner laid the theoretical foundations of cognitive development. L. Vygotsky's theory of the *Zone of Proximal Development* emphasizes the importance of social interaction and guided learning in cognitive growth. According to this theory, learning precedes development and facilitates higher mental functions.

J. Piaget's cognitive development theory describes learning as a stage-based process, where individuals construct knowledge through interaction with their environment. His work highlights the importance of age-appropriate instruction and active engagement in learning. J. Bruner introduced the constructivist approach, arguing that learners actively construct

knowledge through discovery and inquiry. This approach aligns closely with innovative pedagogical environments that emphasize student-centered learning.

Modern research, including OECD's *Education 2030 Framework*, stresses the importance of developing higher-order thinking skills, such as critical thinking, creativity, and problem-solving. These competencies are essential for adapting to complex real-world challenges.

In the context of teacher education, scholars emphasize the integration of interdisciplinary approaches, digital technologies, and interactive methods to enhance cognitive development. However, there is still a need for systematic research on the mechanisms that effectively support the formation of cognitive competencies in future primary school teachers.

### Research Methodology

The research employed a mixed-method approach combining theoretical and empirical methods.

- analysis of pedagogical and psychological literature;
- observation of the educational process;
- surveys and questionnaires;
- testing to assess cognitive competence levels;
- experimental teaching;
- statistical analysis.

The study involved 60 undergraduate students majoring in Primary Education:

- 30 students in the experimental group
  - 30 students in the control group
1. **Diagnostic stage** – assessment of initial cognitive competence levels
  2. **Formative stage** – implementation of innovative pedagogical strategies
  3. **Control stage** – evaluation of final results

### Assessment criteria:

- level of knowledge acquisition
- analytical and critical thinking skills
- problem-solving ability
- reflective competence

### Main Part (Results and Discussion)

The formation of cognitive competencies in future primary school teachers within an innovative pedagogical environment is ensured through several key mechanisms:

#### 1. Interdisciplinary Integration

Combining different subject areas fosters holistic thinking and helps students establish connections between concepts. This enhances their ability to apply knowledge in real-life situations.

#### 2. Use of Interactive Teaching Methods

Methods such as brainstorming, case studies, debates, and collaborative learning stimulate active participation and critical thinking.

#### 3. Implementation of Digital Technologies

The use of ICT tools, online platforms, and multimedia resources increases student engagement and supports independent learning.

#### 4. Problem-Based Learning

Creating problem situations encourages students to think analytically, explore solutions, and develop decision-making skills.

#### 5. Reflective Practice

Encouraging students to evaluate their own learning process enhances metacognitive awareness and self-regulation.

### Experimental Results

The experimental data indicate significant improvement in the cognitive competence levels of students in the experimental group:

Level	Before (%)	Experiment	After (%)	Experiment
Low	48		18	
Medium	32		37	
High	20		45	

The results confirm that innovative pedagogical environments and integrative approaches positively influence cognitive development.

### Conclusion

The study confirms that the formation of cognitive competencies in future primary school teachers is more effective within an innovative pedagogical environment. The use of integrative approaches, interactive methods, and digital technologies significantly enhances students' cognitive development.

It is recommended to:

- expand the use of interdisciplinary teaching;
- integrate digital tools into teacher education;
- promote student-centered and problem-based learning;
- develop reflective practices in educational programs.

Future research should focus on developing advanced models for cognitive competence formation and their implementation in teacher training systems.

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