Introduction: Why a Pedagogical University Should Train Not a “Subject-Matter Specialist” but an “Architect of Thinking

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Annotation

In this opening article of the series I lay the conceptual foundation for the restructuring of pedagogical education in the CCFP paradigm. My key thesis: the pedagogical university today prepares "subject specialists" - transmitters of knowledge - whereas the school of tomorrow requires "architects of thinking" - facilitators capable of diagnosing and developing mental mechanisms through any subject. Drawing on the CCFP model presented in previous articles of Issue 4, on an analysis of the current state of pedagogical education in Russia and the world, as well as on current research of 2024-2026, I substantiate that the traditional subject-centric model of teacher preparation reproduces itself and is incapable of ensuring the systemic development of thinking in schoolchildren. I show that the restructuring of teacher education is not simply an "improvement of the school," but a breaking of the epistemological trap and a strategic task of the evolution of the cognitive potential of the species. The transition to a new model requires a change in the target orientation of pedagogical programs, a revision of their content, methods and forms of organization, as well as a change in the role of the instructor of the pedagogical university. I pay special attention to the fact that the preparation of the "architect of thinking" is not an "addition" to existing programs, but their radical restructuring, beginning with the diagnostics of mental mechanisms in the students themselves.

Keywords: pedagogical education, CCFP, mental mechanisms, subject-centrism, architect of thinking, facilitation, diagnostics, epistemological recursion, epistemological trap, teacher preparation.

Introduction: Why I Am Writing This Series

Over the seventeen articles of the previous issue I have consistently shown how each school subject can become an instrument for the development of the eleven mental mechanisms. I have substantiated that biology is not terms and classifications, but the science of life as a system [6]. Geography is not maps and capitals, but space, interconnections and global thinking. History is not dates and facts, but causality, the multiplicity of interpretations and strategic thinking. Each subject, if it is taught correctly, develops thinking. But I must ask the question that inevitably arises: who will teach all of this? The answer is obvious: teachers who themselves came out of pedagogical universities. And here I encounter a fundamental problem. The very pedagogical institutes that should prepare teachers of the new formation are themselves built according to the old model. They prepare "subject specialists" - people who know their subject and are able to explain it. But they do not prepare those who are capable of designing the development of thinking. It is like wanting to build a new house but using old blueprints and old tools for it. Or, to use the image of Socrates, who did not transmit knowledge but helped it to be born in dialogue, the modern pedagogical university resembles a teacher who, instead of leading the pupil to knowledge, simply reads him a lecture on how to seek truth correctly.

Diagnostics of the Current State: What We Have

Before proposing changes, I must honestly say what we have today. The situation in pedagogical education - both in Russia and in the world - is far from ideal. First, the gap between theory and practice. As researchers note, the key challenge of contemporary pedagogical education is "the mutual integration of theory and practice, the necessity of overcoming the gap between theoretical preparation at the university and practical activity in the school" [9]. Students study pedagogy and psychology as abstract disciplines, but do not know how to apply this knowledge in a real classroom. A 2025 study shows that "graduates, mentors and instructors of pedagogical universities have divergent

expectations about what the pedagogical program should prepare for" [12]. Second, subject-centrism. Pedagogical universities are built on the faculty principle: the history faculty prepares history teachers, the mathematics faculty - mathematics teachers, the philology faculty - teachers of the Russian language and literature. The student masters his subject, studies the methodology of teaching it - and comes out with the conviction that his task is to "give knowledge" in his subject. The development of thinking is discussed only as a "side effect" - if it is discussed at all. This is precisely the essence of the "conveyor-belt school" [1] transferred to the level of higher education. Third, the absence of a diagnostic culture. Future teachers are not taught to diagnose the thinking of students. They know how to check the knowledge of facts and the ability to solve tasks according to an algorithm - but they do not know how to see at what level the student's critical thinking is, how his ability to build cause-and-effect relationships develops, how his emotional intelligence is formed. And without diagnostics it is impossible to manage development. Fourth, the reproduction of the old model. Here we encounter the manifestation of what I have called the "epistemological trap" [2]. A teacher teaches the way he was taught. An instructor of the pedagogical university teaches the way he was taught. The system reproduces itself. As a 2025 study notes, "the seeds of teacher attrition are already planted in pedagogical education" [12]. In order to break this circle, what is needed is not an "addition" to programs, but a change of paradigm. The cognitive apparatus of the university instructors themselves is formed by the old model, and that is precisely why they are often unable to comprehend the necessity of overcoming it. Researchers from different countries arrive at similar conclusions. An analysis of pedagogical education in Vietnam showed that "the management of learning outcomes was not effectively based on competency standards, which limits its role in evaluating and improving the quality of pedagogical preparation" [13]. A study in Greece and France revealed "common problems, such as balancing between academic autonomy and pedagogical readiness" [13].

What the "Architect of Thinking" Is and How He Differs from the "Subject Specialist"

I introduce this concept not by chance. The "architect of thinking" is a teacher who sees his task not in "transmitting knowledge," but in designing the environment and situations in which the student's thinking develops. He is like an architect who designs not a building, but the space in which people will live, work and create. Drawing on the conception of Andy Clark and Kim Sterelny (Issue 3, Art. 13), one can say that the teacher-architect is the designer of a "rich cognitive niche" in which every element of the environment (from the task to the physical space of the classroom) works for the development of mental mechanisms. How does the "architect of thinking" differ from the "subject specialist"? The subject specialist knows his subject. The architect of thinking knows which mental mechanisms are developed through his subject, and consciously designs the lesson so that these mechanisms are actualized and trained. The subject specialist explains the material and checks its assimilation. The architect of thinking creates situations in which the students themselves arrive at knowledge through thinking. The subject specialist evaluates the correctness of the answer. The architect of thinking diagnoses the dynamics of thinking - how the student has changed compared with the previous time. The subject specialist works with the class as a single whole. The architect of thinking sees the unique abilities of each student and uses them as a "point of entry" for the development of all the other mechanisms. The subject specialist teaches the subject. The architect of thinking teaches thinking through the subject.

Research confirms the importance of this shift. Contemporary requirements for the teacher include not only subject competencies, but also "meta-subject competencies," "soft skills," as well as "social-emotional competencies" [17]. As a 2025 study notes, "critical thinking is fundamental to the academic success of students and helps prepare them for solving real problems" [14]. But in order to develop critical thinking in students, the teacher must himself possess it - and, moreover, possess the methodology of its development. As researchers emphasize, teachers play a "vitally important role as guides and facilitators of dialogue in order to strengthen the processes of students' critical thinking" [16]. The teacher's role is not to "transmit," but to "facilitate" - to guide, support, and create conditions. That is precisely why I insist: the pedagogical university must prepare not a "subject specialist," but an "architect of thinking." This is not simply a change of terminology. It is a change of the target orientation of the entire system of preparation.

What Changes in Teacher Preparation

If we accept this new target orientation, then everything in pedagogical education must change. Today the goal of a pedagogical program is to prepare a teacher who knows his subject and is able to teach it. Tomorrow the goal must be different: to prepare a specialist who knows the structure and dynamics of the eleven mental mechanisms (and

gives priority to the core [1]); is able to diagnose the level of their development in students; is able to design lessons with a dual purpose (subject content plus the development of thinking); is able to create an environment in which thinking develops naturally and systemically; is able to work with the unique abilities of each student; is able to reflect on his own pedagogical practice.

Today the content of a pedagogical program is subject disciplines, pedagogy, psychology, and methodology. Tomorrow there is added to this (and it becomes the core) the module "Mental Mechanisms and Their Development," which permeates all the other disciplines. The history student studies not only history, but also how history develops cause-and-effect thinking (MM-1), critical thinking (MM-6), constructive argument (MM-7), and strategic thinking (MM-11). The mathematics student studies not only mathematics, but also how mathematics develops logic, abstraction, and forecasting. The philology student studies not only language and literature, but also how they develop eloquence, emotional intelligence, and dialogue. As I already showed in the seventh article of Issue 1, "the teacher of the new formation must possess not only subject methodology, but also the methodology of developing thinking" [3]. This means that every subject methodology is restructured: it includes not only "how to explain the topic," but also "which mental mechanism is developed through this topic and how to do this consciously."

Today the methods of instruction in the pedagogical university are lectures, seminars, tests, and examinations. Tomorrow they are practice-oriented, inquiry-based, and reflective learning. Students do not simply listen to lectures about mental mechanisms - they diagnose them in themselves, in their fellow students, and in schoolchildren during practice. They do not simply study methodology - they design lessons with a dual purpose, conduct them, analyze the results, and correct their approaches. As researchers note, the preparation of future teachers for the 21st century must include "critical thinking, creativity and innovation, resilience and adaptability, ethical awareness and reasoning" [18]. These qualities cannot be developed through lectures - they are developed through practice, through reflection, and through lived experience.

Today the pedagogical university is faculties, departments, lecture streams, and seminar groups. Tomorrow it is inter-faculty modules, project laboratories, pedagogical studios, and laboratory schools. Students of different faculties meet at common modules - "Logic and Critical Thinking," "Rhetoric and Communication," "Psychology of the Development of Thinking," "Project Activity." They learn to work in interdisciplinary teams - exactly as they will have to work in a school where subjects are not isolated but interconnected. As I showed in the eighth article of Issue 1, "the implementation of the CCFP model is impossible without the creation of the appropriate infrastructure" [4]. This applies to the pedagogical university as well: studios, workshops, and laboratories are needed where students can practice what they learn.

Today assessment in the pedagogical university is examinations and tests checking knowledge. Tomorrow it is a portfolio, demonstration lessons, the solving of pedagogical cases, and reflective reports. We assess not whether "the student knows the theory of the CCFP," but whether "he can design a lesson with a dual purpose, conduct it, diagnose the result and reflect on his practice." This is not "knowledge," but a readiness to act. As a 2025 study notes, "there is a growing consensus that students should learn 21st-century competencies" [18]. But this consensus must extend also to those who teach the teachers. We must assess not knowledge, but competence. Not theory, but practice. Not the static, but the dynamics.

The Role of the Instructor of the Pedagogical University

I must also speak of those who will prepare the "architects of thinking" - the instructors of pedagogical universities. Their role too is changing. The instructor of the old formation is a transmitter of knowledge. He reads lectures, conducts seminars, and administers examinations. He knows his subject and is able to explain it. The instructor of the new formation is a facilitator of professional development. He does not "give" knowledge to students - he creates conditions in which students themselves arrive at understanding through practice and reflection. He does not simply teach methodology - he models the pedagogical practice that the students will have to implement in the school. Research confirms: "instructors of pedagogical universities need professional development in the field of teaching critical thinking and the inclusion of digital instruments for the co-construction of knowledge" [14]. But this is not simply "adding a course" - it is restructuring the entire culture of teaching in the pedagogical university. As I showed in the seventh article of Issue 1, "the preparation of such teachers requires the restructuring of pedagogical education" [3]. And this restructuring begins with the instructors of pedagogical universities themselves. They must become the first "architects of thinking" - for their students.

Why This Is a Strategic Task, and Not a Methodological Question

I want to emphasize: the restructuring of pedagogical education is not a "methodological question" and not an "administrative reform." It is a strategic task. Why? Because the teacher is the key agent of change. One can rewrite textbooks, change standards, and build new infrastructure - but if the teacher does not change, nothing will change. The teacher is the one who stands before the class every day and creates (or does not create) the conditions for the development of thinking. Without a change in the teacher all reforms will remain cosmetic. Because the pedagogical university is a "factory of teachers." If the factory produces a product of the old type, no new standards will help. The factory itself must be restructured - its goals, technologies, and culture. Because we are dealing with epistemological recursion. As I substantiate in the article "Epistemological Recursion in Cognitive Science" [8], contemporary neuroscience is stuck in the "correlation trap" precisely because the cognitive apparatus of researchers, formed by the old educational model, is incapable of comprehending the complexity of neurobiological processes. Without the development of mental mechanisms humanity will not be able to solve the "hard problems" of the 21st century. And without the restructuring of pedagogical education it will not be able to develop these mechanisms in the next generation. This is not simply "improving the school." It is a strategic task of the evolution of the cognitive potential of the species Homo sapiens. The country that first implements this model will gain a strategic advantage in the race for understanding the nature of mind. Researchers arrive at the conclusion that "solving the problem of the teacher shortage requires the reconfiguration of pedagogical education" [12]. This is not about "more teachers" - it is about different teachers. About teachers who know how to think and know how to teach thinking.

Conclusion: From Subject-Centrism to the Development of Thinking

I want to end this article with what I began with. The pedagogical university today prepares "subject specialists" - transmitters of knowledge. But the school of tomorrow requires "architects of thinking" - facilitators capable of diagnosing and developing mental mechanisms through any subject. This is not simply a change of terminology. It is a change of the target orientation of the entire system of pedagogical education. This means new goals (not "to know the subject," but "to develop thinking through the subject"); new content (not only the subject and methodology, but mental mechanisms as the core); new methods (not lectures, but practice, design, and reflection); new forms (not faculties, but interdisciplinary modules and laboratories); new assessment (not examinations, but a portfolio and demonstration lessons); a new role of the instructor (not a transmitter, but a facilitator). Research confirms: "the challenges of the times require from pedagogical education not simply adaptation, but anticipatory development" [10]. Anticipatory - that means we must prepare teachers not for today's school, but for the school of tomorrow. For a school in which the main thing is not knowledge, but thinking. Not subjects, but mental mechanisms. Not grades, but development. It is precisely such a system of preparation that we must build - together, step by step, beginning with the awareness that the teacher is not a transmitter of knowledge, but an architect of thinking. In the next article I will show how exactly the programs of pedagogical universities must be restructured - how the general framework of the preparation of the "architect of thinking" looks in practice.

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