The Current State of Pedagogical Science and Practice: Diagnosis of a Systemic Gap

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Abstract

In this article, I analyze the current state of pedagogical science and mass educational practice. My analysis leads to a discouraging conclusion: there is a fundamental, systemic gap between the rich theoretical heritage of Russian and global pedagogical thought and actual school practices. Drawing on the works of the classics of pedagogy - from Ushinsky to Vygotsky - as well as on data from international research and a comparative analysis of educational systems, I substantiate the thesis that the mass school continues to function within the paradigm of industrial society. It is oriented toward the transmission of knowledge rather than toward the development of the communicative-cognitive framework of personality (CCFP), which is the system-forming structure of the cognitive and communicative spheres. I also introduce a refined understanding of mental mechanisms and substantiate the need to move from the assessment of static knowledge to the diagnosis of the dynamics of skill development. I pay particular attention to the fact that this gap has not only local pedagogical but also fundamental epistemological consequences: as long as the school produces thinkers with linear, reductionist thinking, neuroscience is doomed to remain in the "correlation trap." I also show that the implementation of the CCFP model requires not only pedagogical but also material conditions - the creation of spaces in which a child can manifest his or her unique abilities.

Keywords: communicative-cognitive framework of personality, mental mechanisms, core, support, systemic gap, evolutionary mismatch, conveyor-belt school, epistemological recursion, the hard problem of consciousness, individualization of education.

A Diagnosis, Not a Complaint

My name is Alexander Kleymenov. For many years I have observed how the school works, how children learn, how teachers are trained. And every year one circumstance troubles me more and more: pedagogical science has accumulated a colossal body of knowledge about how thinking develops, how mental actions are formed, and how personality acquires its uniqueness in the educational process [1], [2]. However, this knowledge remains the property of a narrow circle of academic specialists. The mass school lives its own life, and this life is far removed from what we know about the nature of learning and development.

Let us recall the words of Vasily Alexandrovich Sukhomlinsky: "Upbringing is a multifaceted process of constant spiritual enrichment and renewal - both of those who are being educated and of those who educate" [8]. This process cannot be reduced to the mechanical transmission of information from teacher to student. It is a living, deep, personal interaction. Yet in our mass school we observe the exact opposite: the student is perceived as a container for knowledge, the teacher as its transmitter, and the learning process itself as movement along the pre-laid rails of the curriculum.

This is not merely my subjective impression. It is a diagnosis that researchers around the world are making about education. But there is another, deeper dimension to this problem that takes it beyond the framework of a purely pedagogical discussion. The gap between pedagogical science and mass practice is not merely a local problem of the school. It is a problem with fundamental epistemological consequences for all of science. As I substantiate in the article "Epistemological Recursion in Cognitive Science" [13], contemporary neuroscience is stuck in the "correlation trap": we record the results of the brain's work but do not understand the mechanism of its self-organization. The way out of this impasse lies not in the plane of creating even more powerful scanners but in the plane of the evolution of the cognizing subject itself. And this, in turn, is impossible without a fundamental restructuring of education. As long

as the school produces thinkers capable only of linear, reductionist first-order logic, humanity will not be able to grow researchers whose cognitive apparatus would be adequate for studying systems of maximal complexity.

Thus, overcoming the gap between pedagogical science and practice is not merely a question of "improving the school." It is a necessary condition for the future of all science, including the solution to the mystery of consciousness. It is in this perspective that I propose to consider my analysis.

The Architecture of the Mind and Its Instruments

Before continuing, I want to clearly define two key concepts that will run through all my articles. This is important because it is precisely in their distinction that the novelty of my approach lies.

Mechanical transmission of knowledge must be replaced by the communicative-cognitive framework of personality (CCFP). This is an integrative structure of the cognitive and communicative spheres of personality that ensures a person's capacity for adaptive, creative intellect. It is that very load-bearing framework which sets the general strategy of thinking, gives stability to cognitive activity, and determines the potential for development. It holds the entire "superstructure" of knowledge, skills, and experience, being formed as a result of the development of higher mental functions and determining how knowledge will be assimilated and creatively transformed.

But the CCFP is not merely a "skeleton" of personality in the abstract sense. It is a cognitive apparatus adequate for studying complex systems. In the article "Epistemological Recursion in Cognitive Science" [13], I substantiate the principle that I call epistemological recursion: in order to cognize a system of maximal complexity (such as the brain), the cognizing subject must possess comparable or superior complexity. The industrial school produces thinkers with linear, reductionist thinking, and such a cognitive apparatus is fundamentally inadequate for studying the brain, which is a nonlinear, dynamic, self-organizing system with emergent properties. The attempt to explain the workings of the connectome by means of linear thinking is akin to trying to measure temperature with a ruler: the instrument does not correspond to the nature of the object being measured. Through the formation of the CCFP in children, we are preparing not merely "successful graduates" but the next generation of researchers capable of deconstructing the logic of their own brain's workings.

The instruments that this architecture employs are mental mechanisms (MMs). These are specific skills, abilities, and operating systems that implement a person's cognitive and communicative activity within the CCFP. I use the term "operating systems" to denote the basic level of the organization of thinking that manages the resources of attention and memory and ensures the launching and coordination of individual thought operations. If thinking is compared to a computer, then mental mechanisms are application programs (critical thinking, mnemonics), while the operating system is the platform that allows them to work together without conflicting with one another. The framework holds the form; the mechanisms provide the motion. Together they form a system in which the whole (CCFP) is greater than the sum of its parts (MMs). Without the framework, the mechanisms lose their effectiveness. Without the mechanisms, the framework remains an empty structure.

In my model, I distinguish eleven mental mechanisms, but this list is not a flat inventory. In the revised article 5 [10], I divide them into two levels: core and support. The core consists of six mechanisms that directly constitute the act of solving a difficult problem: MM-1 (causal relations), MM-3 (emotional intelligence), MM-5 (Socratic dialogue), MM-6 (critical thinking), MM-10 (spatial imagination), and MM-11 (forecasting). Support consists of five mechanisms without which the core does not function but which do not constitute the act of solving: MM-2 (eloquence), MM-4 (mnemonics), MM-7 (constructive argument), MM-8 (nonverbal communication), and MM-9 (information search). Such a distinction removes the question of the arbitrariness of the list. The core is closed because it is dictated by the task itself. The periphery, however, is always open, since it depends on context. Science can expand the supporting level but is unable to arbitrarily change the core.

However, in order for this system to work, the school must structure practice so that the child has the opportunity to manifest his or her inner, hidden abilities. For some children this is music, for others dance, for others mathematics, for yet others woodworking or metalworking. It is precisely through the prism of these unique abilities that each child will be able to develop the remaining mental mechanisms. This principle of individualization through unique abilities is key. But to implement it, the school must provide the child with space for trial. A child will not discover a musical gift within himself if the school has no instruments other than a grand piano in the assembly hall. He will not express himself in sports if the gymnasium consists of two wall bars and ten mats. The creation of infrastructure - studios,

workshops, laboratories - is not an "additional option" but that very indispensable condition without which the CCFP model will remain mere theory.

The Paradox of Knowledge and Non-Knowledge

And now allow me to illustrate this systemic gap using the example of the classics. Let us take Lev Semenovich Vygotsky. He introduced into science the concept of the "zone of proximal development," defining it as the discrepancy in the level of difficulty of tasks solved by a child independently and under the guidance of an adult [2]. Vygotsky insisted that instruction should precede actual development, creating conditions for the transition of mental actions from the external to the internal form. But tell me honestly: how many teachers do you know who in their everyday work are actually guided by the principle of the zone of proximal development? How many lessons have you seen where each child receives tasks at the boundary of his or her capabilities, with support that allows the next step to be taken? I, unfortunately, have seen such lessons only a handful of times. In the mass school, this principle remains more of a beautiful declaration than a guide to action.

The same fate befell the theory of the stage-by-stage formation of mental actions by Pyotr Yakovlevich Galperin. He described the path of transition from the mastery of external actions with objects through action in the plane of audible speech to the transfer of the action into the mental plane [3]. This theory gives the teacher a most powerful instrument for managing thinking. However, in actual school practice it is almost never applied. The knowledge exists, but its application does not. This is the central paradox: pedagogical science possesses a conceptual apparatus sufficient for the radical transformation of practice, but this apparatus remains locked in an ivory tower, in demand predominantly in the academic environment.

And this is not a local Russian peculiarity. In 2025, the authoritative journal npj Science of Learning (published by Nature) published an article prepared by the heads of five research laboratories from Great Britain, France, and Chile [12]. The authors state: despite all the achievements of science, "classroom practices and teacher training remain to a significant extent uninformed by research." Scientists are interested in whether a strategy worked in general, on the basis of rigorous data. Practitioners, however, are concerned with something entirely different: "Will this work in my classroom, in my specific situation?" [12]. Teacher training remains hostage to outdated theories. Moreover, it retains concepts long since refuted by science. A striking example is the model of "learning styles" (visual, auditory, kinesthetic learners). "The overwhelming majority of teachers continue to believe in it," the authors write, "despite convincing evidence that these practices do not have a positive effect on outcomes and may cause harm" [12].

The Geography of the Systemic Impasse

Why, then, is the system so inert? An answer to this question is provided by the concept of evolutionary mismatch, being developed by contemporary researchers [4], [5]. Paradoxical as it may seem, the traditional school contradicts human biological nature. It resembles a Procrustean bed: children are forcibly fitted into rigid frameworks of standards, cutting off everything alive, nonstandard, and curious. In hunter-gatherer tribes, children learned through practical, joint experience. In modern schools, they learn in age-graded classes through the passive consumption of information. In traditional societies, children learned through self-directed, mixed-age play groups, and adults did not interfere. In modern schools, a strict schedule and constant control dominate. Reading, writing, and mathematics are evolutionarily new skills that are not supported by the same built-in brain mechanisms as the acquisition of language. And finally, the school chains children to desks for long hours, although they are evolutionarily adapted to movement and active play [4]. Researchers emphasize that modern schools create an "evolutionary mismatch for boys to a greater extent than for girls... This leads to boys being disproportionately often identified as having behavioral difficulties" [4]. The school is not merely ineffective; it contradicts our biology.

And here international experience is very instructive, for different countries attempt to cope with this challenge in different ways. Let us turn to Finland, which is often cited as an example of successful reform. What is the secret? In the absence of unified management of all schools: organizations enjoy significant autonomy owing to great trust in the teaching staff. In the departure from standardized tests: there is only one national test for upper-grade students. And, most importantly, the profession of the Finnish teacher is chosen by very talented people, obtaining a diploma is not easy, and the qualifications of educators are high at all levels [9].

However, not every departure from standards works. Look at Sweden in the 1990s. Schools received the right to be managed by private operators, by analogy with American charter schools [6]. By 2023, almost half of Stockholm's

schoolchildren attended such "charter schools," with 80% of them being commercial operators. A study by Petter Berg showed that attending charter schools "reduces the timeliness of school completion by 2.3 percentage points and reduces college enrollment by 3.2 points" [6]. This example proves that the problem is not whether the school is public or private. The problem is what model lies at the foundation of education. If the model is oriented toward formal indicators rather than the development of thinking, it inevitably fails.

In the East we see a different picture. The Japanese school, having passed through "examination hell" (shiken jigoku), encountered economic stagnation in the 1990s and the problem of hikikomori (school refusers). In response, the Ministry of Education carried out reforms aimed at developing "living power" (ikiru chikara). The reforms met with resistance from teachers and parents, but the Japanese experience shows that even in a country with deep traditions of examination culture, changes are possible if they are recognized as a historical necessity [7]. China, with its scale and traditions of rote learning, is of no less interest. Since 1985, a transition to "quality education" (suzhi jiaoyu) was proclaimed there, and in 2010-2020, a transition to "education oriented toward the development of key competencies" (hexin suyang) [11]. The gaokao remains the dominant factor, but the Chinese experience proves that even with an enormous number of students, systemic changes aimed at developing thinking are possible. Different cultures, different systems, but the problems are the same - which means they are structural.

The Trap of Static Assessment

The situation is aggravated by the traditional assessment system, which, in my view, is one of the main reasons for the viability of the old model. In the traditional school everything is simple: there is a right answer, and there is a wrong one. This system is understandable to the teacher, the parent, and the student. It scales easily and is amenable to control. But it is precisely this simplicity that is its main defect. By assessing only facts, the system does not assess thinking. It does not see how the student arrived at the answer, what reasoning he constructed, what mistakes he made and how he corrected them. It assesses a static cross-section, not the process of development.

Here I am reminded of the famous episode from Antoine de Saint-Exupéry's "The Little Prince." The adults saw a hat in the drawing, while the child had drawn a boa constrictor that had swallowed an elephant. The traditional assessment system is those very "adults": it sees only the final result - the "hat" (the right or wrong answer) - but does not notice at all the inner process, the "boa constrictor that swallowed the elephant" - those complex, at times agonizing, but incredibly important thought operations that led the child to this answer.

In my model I propose a fundamentally different approach: the assessment of the dynamics of skill acquisition. Not "what he knows" but "how he thinks." For example, at the initial stage, in order to determine causal relationships, the student must first reproduce the external, practical sequence of actions, then describe it in speech, and only then transfer it to the internal, mental plane. The teacher observes not the final answer, but the trajectory of this transition, recording how the student's mental mechanisms are restructuring and maturing.

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