

Knowledge Is Not a Droplet Infection — It Can't Be Transmitted Through the Air ...

Interview with Victor Tslaf, Director of the Samara Business School (Russia)



Photo from V. Tslaf's archive

The idea for this interview originated from our desire to clarify one of the so-called “difficult terms,” which have been perplexing the editors and translators of our bi-lingual journal for years: **pedagogical** (or teaching, or educational) **technologies**. In English the term usually refers only to technical improvements (hardware and/or software) applied to education (cf. web-based educational technologies, videoconferencing technology, etc.). In Russian, however, the term pedagogical technology is used in contexts where English might use the terms teaching method or teaching process; or educational system or approach. In other words, the Russian term refers to teaching approaches that have nothing to do with computers or any other technological achievements; the second part of the term indicates only that these are well-elaborated approaches, with fully thought through rationales for practice and a suggested set of methods (for example, the RWCT approach—Reading and Writing for Critical Thinking—known to many of our readers). Such approaches, however we choose to describe them, are gradually gaining momentum worldwide and thus warrant our attention. Time will tell whether the two languages will some day coin a common term that would be appropriately clear in both. Meanwhile, our editors, **Alison Preece** and **Natalia Kaloshina**, decided to consult someone for whom pedagogy and technology would be equally familiar working concepts: **Victor Tslaf**, Director of the Samara Business School, and Director of the Samara Research Institute of Regional Economic Problems. Dr. Tslaf is a methodologist, which implies, as he puts it, “making interdisciplinary connections and creating methods where there is a lack of them.” He not only answered the main question that initially caused us to approach him, but also offered us a fresh, unexpected perspective on methodology.

N.K.: *Dr. Tslaf, in your opinion, how appropriate is the term pedagogical technologies, currently used by Russian educators to mean highly rationalized teaching approaches? Is technologization of the teaching process possible at all?*

V.T.: To answer this question, we first have to analyze the correlation of the two constituents of the term, *pedagogy* and *technology*. If the concepts are compatible, then the term is meaningful and makes sense. If not, then it is no more than a meaningless verbal construction.

N.K.: *So we are going to split the term in two and consider both parts separately?*

V.T.: Quite so. *Technology*, in a primary sense, is a rigidly set sequence of actions, which, when applied to a preset starting material, allows us to obtain some preset product. The notion *technology* is akin to *algorithm*—technologies possess all three characteristics that are attributed to algorithms: *determinacy*, *replicability*, and *effectiveness*.¹ *Determinacy* means that the sequence of actions is predetermined, leaving no choice for the performer, unless the choice itself is an element of the

process. *Replicability* is a property that allows for repeated use of the same technology, in identical situations, in order to obtain the same product. *Effectiveness* means that if you follow the system and perform a certain (always definite) number of procedures, you are guaranteed to obtain a product of a preset quality. Moreover, a technological system assumes that both the starting material (raw materials, initial data, etc.), and the means of activity correspond to an established standard. Therefore, *systematization* is always associated with *standardization*.

A.P.: *So far, what you are talking about seems infinitely remote from the realities of teaching...*

V.T.: You are perfectly right. *Technology* describes, in the first place, actions with material objects, performed to obtain a product or energy. However, as time went on, in Russian the concept of technology broadened to include actions aimed at obtaining, communicating, processing, and storing information. Teaching also has to do with the transfer, storage, and processing of information. This accounts for the appearance of this new term—pedagogical technologies.

¹ See, e.g.: Aizerman, M.A., et al. (1963). *Logics. Automatic Machines. Algorithms* (in Russian). Moscow: Fizmatgiz.

N.K.: *And how would you define its first component, pedagogy?*

V.T.: Strange though it may sound, since pedagogy has been around for many centuries, I'd say that the subject matter of this science is not yet clearly defined. Among modern educators, we find very different understandings of what they are doing and why. Often different teaching approaches coexist even within one school.

The classical paradigm of teaching, still shared by many educators, is "we give our students knowledge," or, in its fuller version, "knowledge and skills."

According to a more modern concept, education is guiding a student's development. What sort of development? Development of what? Here again we get a wide range of answers. The broadest and most vague of them is *development of personality*. Then comes *development of thinking*. And there are many other definitions, and much has been written about the content and process of this development.

Lastly, the modern pragmatic or competence-based approach: We create opportunities for our students to engage in a wide range of practical activities, or, on the contrary, a narrow range of selected areas. The wide range is associated with general education, and the narrow range with professional education.

A.P.: *Which of these three conceptual frameworks do you find most acceptable?*

V.T.: Let's begin with the one that I'm not willing to accept, the simplest one: knowledge transfer.

What is knowledge? Again, centuries of study in the field of epistemology have

provided no single answer to this question. So we shall not try within the framework of our interview to do the impossible—let's focus on a few basic points.

From the moment of birth (we'll leave aside the possibility of prenatal cognition, although this question is raised by some experts) a person is getting to know the surrounding World, and his or her conscious mind reflects this World. This reflection is not created automatically, but as a result of the individual's cognitive or investigative activity. The content of our consciousness that we call *knowledge* of the World is in fact an abstract, essentially incomplete, and approximate reflection of the World.

N.K. Why incomplete?

V.T.: Because this reflection is created as a result of our cognitive (investigative) activity, which forms idealized images in our minds of the objects found in reality, through a process of abstraction from the many properties of this reality. As we continue to investigate the World, we can supplement these images and make them more precise, but our knowledge will never become absolutely full and authentic, since our cognitive activity will always be based on abstraction—and abstraction necessitates ignoring many concrete properties of the real objects.

N.K.: *Is this true of cognitive activity in general—or more particularly of knowledge that is formed in the teaching-learning process?*

V.T.: It's true of any knowledge. However, while humanity in general can construct

Victor Tslaf's fields of activity

Technical cybernetics; application of electronic devices; mathematical and cybernetic methods in medicine; theoretical and normative metrology; metrology in testing and analytical chemistry; metrological assurance of production; professional development planning for managers and specialists; business theory and design; management theory and methodology; research and practical work in the systems of higher education and professional development; development of *free type games* (analytical innovative sessions) and their implementation in consulting and education; strategy consulting; and theory and practice of regional development, including the elaboration of complex programs of territorial

development. He has achieved significant results in all these spheres; in particular in education, Dr. Tslaf is the author of an integral educational approach, the Concept of Adaptational Business Education, which has been both theoretically elaborated and practically implemented at the secondary school and professional education level. This approach involves humanitarian education aimed at helping students adapt to life and activity in constantly changing social, economic, legal, and cultural conditions. The main focus of Dr. Tslaf's activity in all spheres is *methodology*, the construction of general methods of problem solving in corresponding fields of theory and practice.



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During the interview, from left to right: Victor Tslaf, Alison Preece, Natalia Kaloshina

ing his or her own unified body of knowledge, and no one is even assessing this result in a subject-centered curriculum. We can only check for memorization of information and to see whether meaningful links have been formed with the nearest blocks of information, from the same or related disciplines.

One can supplement knowledge by adding new concepts to its structure or by connecting the old ones with new links—if such additions do not contra-

idealized cognitive constructs only through direct experience, there is another path for individuals: through communication with other people.

N.K.: As in teaching and learning?

V.T.: Including teaching and learning. But can individuals acquire *integral* images through communication? No, they can't, because all images are interconnected by their meanings, and these connections are unique for each person. The aggregate of realized cognitive acts is unique for each individual—hence, the mental objects and their connections are unique too. In communication we receive information, and this information becomes linked in some way to what is already stored in our minds (This is the principle known to educators as *apperception*.)

A.P.: And what if it is not linked?

V.T.: If new information fails to connect with previously constructed images, it can still be stored in memory, but it forms new objects that also are not linked with the previously constructed ones—and then consciousness is deprived of integrity, taking the form of isolated concepts. The modern education system, with its organization of the curriculum by subject, and poor interdisciplinary connections, exacerbates the challenge of building integrated, coherent systems of knowledge.

So, coming back to the knowledge transfer approach: Knowledge is not a droplet infection—it can't be transmitted through the air, or through teacher-student contact. Information is transferred, but we don't know beforehand whether the student will or will not be able to use it in construct-

dict the existing structure of the knowledge. However, individuals need to be motivated to make such additions... and, as any teacher can tell you, motivating students to learn is not always a straightforward proposition.

Knowledge can also be *developed*. In this case existing links are replaced by new ones, and the existing knowledge is restructured. But here, too, motivation is needed—and again it's a problem that cannot be solved within the knowledge transfer approach.

The motivation for knowledge development comes from problematization. It arises when a person is unable to resolve some concrete situation using only their existing knowledge. In the classroom, a student searching for a solution may make use of information received from the teacher, but this information needs to be processed if it is to be transformed into knowledge. Development of knowledge is definitely not the transfer of knowledge from teacher to student. It is a fundamentally different process, which requires reflection and thought, and it is dependent upon the individual student's initial level of knowledge, which is unique in each case.

Thus, we have to admit that the knowledge transfer framework proves untenable. But this does not mean that *teaching* to support the construction of new knowledge in students is impossible—only that it cannot be reduced to “knowledge transfer.” It involves *development* of students' knowledge through a process of reflection and thinking, in the context of opportunities for creative problem solving offered by the teacher.

A.P.: And so what are the implications of this for “thinking development”?

V.T.: First, the development of thinking, like the development of knowledge or any other development, requires problematization, which can only arise from an individual’s inability to resolve a particular situation. Second, any development is a process of transition to a new state or level, conditioned not only by the steps taken in this direction, but also by the initial starting point. Third, development of thinking implies the development of the ability to find new approaches to situations, moving beyond existing rules and approaches.

A thinking individual should be able to perform a number of intellectual operations:

- *investigate* the situation, i.e. identify its basic, essential properties, in order to be able to predict how it might change;
- *analyze* the situation, i.e. find the contradictions (problems) that are preventing him or her from reaching the desired goal using the available means;
- *resolve* these contradictions, thereby transforming problems into feasible tasks;
- *envision* the desired state of the situation, i.e. set *goals*;
- *plan* actions to achieve the goals.

Thinking, therefore, is a process of reasoning (discourse) that allows an individual to generate new knowledge that will guide him or her in accomplishing certain tasks. By the way, existing procedures may be entirely adequate for accomplishing some tasks, provided the methods suit the particular situation. Thinking comes into play only when the situation cannot be resolved within the available framework of knowledge. The starting point for thinking is information obtained on the basis of *reflection* on the situation and *communication* with other individuals².

To cope with the above tasks, a thinker has to possess both *methodological* knowledge and the skills to apply it in the construction of new knowledge regarding what actions would be possible and effective in a given situation. And we can *teach* students these methods and these skills.

A.P.: So how would you characterize such teaching?

V.T.: Basically it involves three things, which follow from the essential characteristics of any development process:

1. Creating problem situations, never before encountered by the students, that can be

resolved through reasoning (discourse), and that require recognition of the limitations of the available knowledge;

2. Considering the initial knowledge and thinking level of each individual student;
3. Teaching students both methodological knowledge and the skills required to apply it.

As you can see, both the knowledge transfer and the development of thinking approaches are based on the assumption that the development process needs to be organized.

N.K.: And the above-mentioned competence-based approach?

V.T.: This approach implies different requirements for the content of the teaching process, but not for how it is implemented. Clearly, the development of knowledge and thinking is essential for this third approach too... However, we have to come back to *teaching technologies* [methods]. As we have just seen, the situations that foster creative problem solving, as well as the initial level of knowledge and thinking skills, are unique for each individual and cannot be standardized. Hence, *the characteristics of teaching revealed in our analysis, on the one hand, and the requirements inherent in technologies—determinacy, replicability, and standardization of means and materials—on the other hand, lead to a contradiction.*

N.K.: Meaning that the Russian term teaching technologies lacks terminological coherence?

V.T.: Quite so. In the literal sense of the word—as it is used in other fields—pedagogical *technology* is not possible.



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² See: Shchedrovitsky, G.P. The scheme of thinking activity: System-structural pattern, meaning, and content. In: G.P. Shchedrovitsky. *Selected Works* (in Russian). Moscow, 1995, pp. 281–298.

A.P.: *What then is the implied meaning of this increasingly popular term?*

V.T.: I think, our use of *teaching technologies* can be understood as:

- A statement of the main principles of a particular teaching approach;
- A step-by-step description of the implementation of these principles;
- A tool box, with which an educator, acting according to the *situation* and considering the *characteristics of particular students*, will more likely attain the aims of this teaching approach.

What is important here is that teachers who take it upon themselves to implement these “technologies,” should not merely be trained specialists, but *thinking and/or creative professionals*. Mastering any rationalized approach to education requires the personal and professional development of teachers.

A.P.: *One thing that often worries me (professionally... as someone who works in the preparation and professional development of teachers) is the apparent absence in many teachers of an internally coherent or even explicitly articulated theory of practice... i.e. the why of what they do. I don't mean in terms of simply embracing or aligning themselves with one of the theoretical positions that are out there but of fully thinking through the rationale for how one approaches teaching. I hear people claim to take the best wherever they find it... but I am concerned when this is done without any methodological basis.*

V.T.: I can read at least several questions in what you are saying... No system in one's work, no theory, no understanding of the mission or even the goal of one's activity, no methodological basis—these are all different things, although they may probably have the same explanation.

According to Max Weber, one of the founders of modern sociology, social action, like any other action, may be: “(1) goal-rational, i.e. determined by external expectations concerning objects or other people's behavior, and, through these expectations, by a rational judgment concerning both the situation and the means to attain the goal; (2) value-rational, i.e. resulting from a conscious belief in the absolute (inherent) value of a particular course of action, irrespective of the outcome of this behavior and whether the

value is interpreted as ethical, aesthetical, rational, or other; (3) affective—affected-driven or guided by emotional states; (4) traditional—guided by custom or habit.”³

Goal-rational behavior, which implies an understanding of mission and goal, as well as a theoretical and methodological basis, is a rare occurrence.

And we'll leave out affective behavior. Its causes are diverse and multiform—very often it stems from stressful conditions or cultivated permissiveness—but I don't think this is what you have in mind...

Value-rational and traditional behaviors, however, are very common. They have the advantage of saving people's energy. Value-rational behavior does not presume conscious goal setting, or a deep understanding of the mission: We act according to our *beliefs*, perceived absolutely and uncritically.

N.K.: *What does value-rational behavior look like in practice—say, in the work of a schoolteacher?*

V.T.: Take for example, the ubiquitous phrase, “we must develop our students' thinking” (as a duty of all modern educators)—This is just ideological dogma. “Why develop it, for what?”—“What difference does it make? Wiser people have already thought of it.” Hiding behind authority is one of the most common ways to mask one's own laziness or incompetence. There may be other explanations too, including inferiority complexes or just simple-mindedness: “Why develop thinking?”—“Is it even possible not to?”

Another question is: *How* should we develop thinking? —“Here we have recommended guidebooks, it's all in there.” Or else we may, as you've just said, “take the best wherever we find it” and use it in our own teaching. But techniques taken from *different* teaching systems sometimes turn out to be incompatible with each other, though there may be no cautions about this in the recommended guidebooks. So being eclectic often comes down to being chaotic in one's teaching, which is hardly what we were after.

N.K.: *And traditional behavior?*

V.T.: Traditional behavior is when we follow set routines without consciously interpreting our own actions, when we behave “as usual.” And since it helps us save energy in the course of our activities, it's the most widespread type of behavior. Habitual

³ Cited from: Parsons, T. (2000). Structure of social action. Ch. 17. Max Weber: Systematic Theory. In T. Parsons, On the structure of social action. Moscow, pp. 157–158.

routines are most often formed either by borrowing action patterns from the social environment, or by repeating actions that have worked for us previously. Such behavior does not usually lead to a search for new methods...



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N.K.: *Why do you think these two types of behavior—value-rational and traditional—continue to be so widespread in the teaching profession, where the understanding of mission, goals, and methods are so important? What can be done to change this situation?*

V.T.: The trouble is that we have *teacher training*, instead of a *teacher development* system. Trained teachers teach as they were trained—and for most of them, development was not part of their training. They ignore problem situations and tend to act in any situation as they were trained to act. Moving along in their careers, they don't encounter situations where they need to seek out novel ways to respond to the issues—which in fact is the essence of the problem situation.

I don't mean to cast aspersions on teachers here. It's just that teachers are trained, instead of being developed, and that's their trouble, not their fault.

It's easier to train than to develop. But there is one simple truth: If I do not develop myself, *here and now*, I cannot develop others. If I have set up a problem situation for my students, but I myself know the solution, the students will never believe it's a real problem. And they won't look for a solution; they'll look for an opportunity to ask me the solution. A problem situation has to be a problem for both students and teacher. Then the process of *co-development* will be a process of education, not just training. But this may prove disconcerting and discouraging. And there is always the risk that you will be unable to cope with the problem in front of your students, and not all teachers are prepared to take such a risk.

As for what can be done to change the situation... We have just touched upon a whole spectrum of issues concerning *teacher education*. Successfully addressing these issues will create a *development-oriented professional environment* for teachers and will provide motivation for them to develop themselves and their

students. Only then will we be able to speak about the need for—or rather a demand for—a methodological basis for teaching.

A.P.: *What do you understand by methodological basis?*

V.T.: First, the methodology of any sphere of activity cannot be constructed from the material of this same sphere of activity. You can't build a house on its own base, houses are built on the ground, and the base is a part of the house that rests on the ground. Archimedes knew that in order to move the Earth, one would need a fulcrum, and this fulcrum would have to be beyond the Earth. Only Baron Münchhausen succeeded in pulling himself and his horse out of the swamp by his own hair. Many sciences try to build by Münchhausen's principle instead of Archimedes'—basing their methodology on their own content...

Thus, methodology of pedagogy cannot be constructed on its own content material. *It has to be built outside pedagogy*. This doesn't mean it must be imported from somewhere else—teachers can accomplish this task themselves, but by assuming the role of methodologists.

Second, methodology is about creating and using methods. Where are all methods created and used? In human thought and action. Hence, *general* methodology should be created as a general theory of thought and action. Specialized methodologies related to particular spheres of activity—such as the methodology of education—can only be based on such general methodology. This type of general methodology was created in Russia by the outstanding philosopher Georgy Shchedrovitsky (1929–1994) and his team, who also made a significant contribution to methodology of education. But in the Soviet times their findings were at odds with the communist ideology, and as a result they have only recently begun to be



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published. Anyway, the papers of Shchedrovitsky and his followers do not contain a complete methodology of education. So we could say that for now, the lack of an integral methodological basis is not simply a problem encountered by individual teachers; it's a challenge to the science of teaching as a whole.

A.P.: What do you think may be the consequences of disregarding methodology in the teaching profession?

V.T.: As in any other activity, neglecting methodology results in poorly formulated structures for action; the chaotic accumulation of different methods and techniques, which sometimes support one another but too often interfere with one another; eclecticism instead of synthesis; avoiding problems that are difficult to solve; formulating pseudo-resolutions and wasting huge amounts of resources on obviously fruitless attempts to implement them; enslavement to fancy language and populist slogans.

In recent decades, a great many talented people in all parts of the world—including Russia—have joined the teaching profession, people who have much to offer and who have made many invaluable discoveries on a purely empirical basis. But no sphere of activity, including teaching, can survive exclusively on talent. Frankly speaking, there are as many mediocre people in the teaching profession as in any other, and we can hardly expect this situation to change in future. For these people, it's always good to have very definite methodologically based recommendations—so as to minimize the potential harm from their activity.

N.K.: Of course, the ideal is unattainable in reality, but striving for it often propels us to move forward... What is for you an "ideal" teaching approach? What important points should be included in its development?

V.T.: The ideal approach to teaching, extrapolating from what I have said so far, is an approach that promotes development through creative problem solving, reflection, and thinking. But in reality such an approach is neither realistic nor necessary in all cases. We won't be able to discuss the *mission* of education in this interview, but it is an extremely serious issue. The humanistic view that we should provide for the thorough and comprehensive development of every individual is, of course, attractive, but when this thoroughly developed individual has to become a janitor or work on an assembly line, he will hardly be grateful for his well-rounded education, which has equipped him with unrealizable social ambitions. Social stratification is a reality; moreover, it is a reality that is necessary for the development of society. Therefore, society needs different "products" from teaching and, accordingly, different teaching approaches. *These social needs must be taken into account when developing systems of education*—but this is, again, a separate topic for discussion, equally concerned with the development of education and society. The tragedy of a person who has no opportunity to realize his or her acquired potential is as serious as the tragedy of someone who does not have access to decent education.

N.K.: What are the underlying principles of your Concept of Adaptational Business Education?⁴

V.T.: The underlying notion of the Concept is that of *adaptedness*, which denotes the degree of a person's independence in providing resources for his or her own life and activities. Adaptedness is achieved on the basis of self-determination and development. The adaptation process includes socio-cultural, social, and psychological components.

The Concept includes a detailed consideration of the teaching/learning process, professional training, and humanitarian education. According to the Concept, the goal of education is *to acquire the potential to act in the World by transforming oneself and the World according to one's system of values*. An education focused, above all, on

⁴ Those who are interested in the Concept or its implementation or would like to ask Dr. Tslaf any other questions can contact him directly at Samara Business School via email: sbs@samaramail.ru

acquiring the ability to understand and change *oneself* is a humanitarian education. In this process the World (the *non-self*) serves as the context for self-transformation. The contrary approach—the technocratic one—is directed toward changing the World, with the *self* seen as the agent of this change. The ability to change oneself within one's *value system* regarding the World is sufficient to enable one to change the World. Humanitarian education is true education—the rest is merely professional or specialist training, aimed at attaining functional literacy in a certain sphere of activity according to a certain World standard. If the real World deviates from this standard the specialist finds himself in a position of functional illiteracy and requires retraining.

I believe that one major achievement of the Concept is a detailed analysis of business, which is understood not as an economic and legal phenomenon, but as a special type of thinking and behavior and a special lifestyle that provides for full adaptation to any environment and steady development throughout one's life. The Concept presents a synthesized image of business as a specific type of human activity. The *credo* of the person involved in this activity includes four vital principles. These are, in short: *live and work in a way that will continuously increase your opportunities; create your own opportunities; maximize your available resources, finding a reasonable balance between profit and risk; coordinate what you desire with what is possible.*

Synthesizing the elaborated notions of education and business allowed for a well-defined concept of business education.

N.K.: Did you manage to implement your ideas?

V.T.: The Concept of Adaptational Business Education was realized in part in 1992–95 in the Samara Business School's work with the unemployed (whom we helped to start their own business enterprises), and more fully in 1992–2001, in work with secondary and high school students (adaptational business education).

N.K.: What were the results?

V.T.: Speaking in the language of facts and figures, the usual success rate of education for the unemployed—both in and outside Russia—is about 30 percent. In other words 30 of 100 unemployed citizens start their own business after taking courses in business training centers. In our case, the “effective yield” was 250 out of 256 people, that is, over 97 percent.

Our work with school students was also shown to be highly effective. We worked in districts of the city that had high unemployment rates and, on the whole, a low standard of living. We began our work with a two-year cycle (grades 10–11), and then moved on to a four-year (grades 8–11) and a seven-year cycle (grades 5–11)—which, in some years, amounted to 400 students. According to our data, all the graduates of our 1994–99 business classes who wished to continue their education in universities or other educational institutions (more than 75 percent) succeeded in doing so.... I can't say, however, that the Concept has been completely realized. First, our work with school students (except for children from an orphanage) was not financed either by the state or outside sponsors. The only meager funding came from the parents, who were mostly hard up themselves. But the basic problem was, again, methodological—the teachers' previous training had not prepared them to accept the suggested approach, and we did not have the resources to provide them with opportunities to fully explore the new concepts.

But turning to my teaching experience outside the Samara Business School, I can say that the Concept's basic principles are being successfully implemented, in particular with students at Samara State University, in my courses on management theory, marketing and business, and others. For me, creative problem solving and reflection are inherent parts of the teaching-learning process—including my lectures, which



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often turn into discussions. The Concept's principles are also realized in an active strategy that I developed and use in my teaching—reflective analytical workshops. It is based on game theory, but that's a topic for a separate discussion.

A.P.: What role do you assign to interdisciplinary connections?

V.T.: I think that it's time to reconsider the nature and role of these connections in education. Traditionally, interdisciplinary connections have been built solely on the basis of common object schemes (for example, the traditional links between literature and history, where the same historical events are often studied from different angles). But I believe that there is another equally important approach: Research and use of interdisciplinary connections based on commonality of *methods*, common approaches to organizing thought and activities. This path has scarcely been explored in current education, but in terms of the goals of humanitarian education it has tremendous practical value.

Often different disciplines deal with the same aspects of the students' worldview, but the essential common perspective of these issues is lost among the details. Here is just one example. In their language classes, Russian students (sixth-graders, if I am not mistaken), are introduced to the concept of *word combination*: They learn that a combination of words (*writing table*) enables the speaker to define an object more precisely than a separate word (*table*). In the same year, in math, students study rounding of numbers—and again there is the issue of degree of precision: More precision is attained by the use of more characters (in this case numbers rather than

words). However, the meaningful connection between these two phenomena is not established, even though they have much in common in terms of both their content and formal logic. Thus, the students miss an opportunity to understand through simple examples an extremely important concept, taught only in some universities in courses on information theory: *More characters are required to express greater precision*. Moreover, there are major inferences for everyday life that follow from this understanding, for example, that it's impossible to describe complex objects in simple terms. As a result of such "unconnected" learning, students tend to believe glib politicians who claim to offer simple solutions to complex problems—and the like. Coming back to the above example, we can see that language teachers are concerned about relations between words, that mathematics teachers are concerned about the rules of rounding off—but that no one appears concerned with helping students construct an integrated *big picture* of related concepts, or with the lifelong practical value that such an integrated understanding could offer.

N.K.: Is there an important question that we have forgotten to ask you?

V.T.: Perhaps whether I consider myself a teacher, and whether I have the right to discuss the issues we have been discussing? I wasn't trained as a teacher, and I felt no connection with the official Soviet pedagogical science (I attempted to study it about 40 years ago). By now, however, my own teaching experience (in the Samara Business School, and other institutions of higher education and professional development) spans more than 35 years, and certain plans and ideas seem to have developed... So the answer is yes, I consider myself a teacher. And what I have been saying here is the result of almost 40 years of theoretical research and practical experience.

A.P.: Is there anything you would wish for our readers?

V.T.: Simple human happiness. Some are lucky to be well-educated and thoughtful individuals, others are lucky not to be... But happiness is what all of us need—so let it be so.

A.P., N.K.: Thanks for your kind words. And for the interview.