

PROF. DR. ANDREY I. PODOLSKIY

Head of Department of Developmental Psychology, Moscow State University,
Docent of Helsinki University and University of Lapland, Finland, Honorary Doctor of
Helsinki University



CURRICULUM VITAE

Address: Profsoyuznaya, 111-1-323, Moscow 117647 Russia.

Phone/fax: (+ 7-495) 4200051, GSM + 7 903 2155995

E-mail: apodolskij@mail.ru apodolskij@mail.ru

Place and date of birth: 20.07.1947, Moscow, Russia

Marital status: Married, 2 children.

EDUCATION

1970: M.A. (Developmental and Educational Psychology), Moscow State University, Moscow, Russia.

1973: PhD. (Cognitive Development/Learning), Moscow State University, Russia

1987: Dr.Sc. (Functional Cognitive Development/Mental Activity Formation), Moscow State University, Moscow, Russia.

Language competence:

Russian (mother tongue), *English* (very good), *Spanish*, *German*, *French*, *Italian* (read and understand), a number of Slavic languages, such as *Ukrainian*, *Check*, *Slovak*, *Polish*, et al. (read and understand)

PROFESSIONAL EXPERIENCE

1970 - 1973 - Researcher, Faculty of Psychology, Moscow State University (FP MSU)
Moscow, Russia

1973 - 1977 - Assistant Professor, FP MSU

1977 - 1981 - Senior Assistant Professor, FP MSU

1981 - 1989 - Associate Professor, FP MSU

1989 - recently - Professor, Head of Department of Developmental Psychology, FP MSU

1993 - recently - Docent (Applied Developmental Psychology), Faculty of Behavioral
Science, University of Helsinki...

1998 - recently - Docent (Applied Developmental Psychology), Faculty of Education,
University of Lapland

1978 - recently - Director of 8 National Projects on Applied Developmental and Educational
Psychology and Teachers' Training.

1980 - recently - Co-director of 9 International Research Projects on Developmental &
Educational Psychology

MAIN RESEARCH/TEACHING INTERESTS

Developmental, Educational and Instructional Psychology;

Kindergarten, Primary, and Secondary School Teachers' Training;

Moral Development and Education;

Internalization Processes;

Child-Parent Relations in Early Childhood and Adolescents

Social, Emotional, and Moral Development of in Childhood and Adolescence

Social, Emotional, and Moral Development in the "Third Age"

Improvement of Parents' Psycho-Pedagogic Competence

Adolescent Psycho-Emotional Wellbeing

Teachers' and Parents' Psychological Competence

COURSES OF LECTURES, SEMINARS, WORKSHOPS

General and Applied Developmental Psychology;

Formation and Development of Mental Activity;

Psychological Training of Teachers' Trainers;

Development, Learning and Instruction in Childhood and Adolescence;

Methodology and Theory of Educational Applications of Psychological Knowledge;

Socio-Moral Development in Childhood and Adolescence

Functional Development of Mental Activity

Developmental Dimensions in Instructional Design

Child-Parent Relations in Early Childhood and Adolescents

Post-Vygotskian Developmental and Learning Psychology and its Educational Application

INTERNATIONAL SOCIETIES MEMBERSHIP

International Society for the Study of Behavioral Development

(ISSBD) - Ad-hoc Member of the International Executive Committee (1999 - 2002)

European Association for Research in Learning and Instruction

(EARLI) - Member, National Correspondent for Russia (1995 –until recently)

European Association for Research in Adolescence

(EARA) - Member of the International Program Committee, National Correspondent for Russia

European Society of Developmental Psychology - Member

INVITED ADDRESSES AND LECTURES

During the last years:

Invited Address in the X International Meeting of ISSBD (Jyvaskyla, Finland, 1989)

Invited Address in the 3d World WACRA Conference (Enschede, the Netherlands, 1990)

Invited Address in the 4th EARLI Conference (Turku, Finland, 1991)

Invited Address in the 3d COTEP International Meeting (Enschede, the Netherlands, 1992)

Invited lectures and lecture courses in the Universities of Bratislava and Brno, Czechoslovakia (1990, 1991, 1992), Helsinki, Jyvaskyla, Joensuu, Finland (1990, 1991, 1992, 1993), University of Utrecht (1995), High Teachers' College in Haarlem, the Netherlands (1991), Catholic University of Leuven, Belgium (1993)

Invited Professorship in the University of Twente, Enschede, the Netherlands(1993). and University of Helsinki, Finland (1996-1997), Invited Professorship in Free University Berlin, Germany (10.2004 – 10.2005), Strasburg University, France (2007, 2009), Invited Professorship in Freiburg University, Germany (2008)

In the 80s- 2000s - a variety of lectures and lecture courses in the universities of Germany, Finland, Spain, Switzerland, Belgium, Check Republic, Slovak Republic, Hungary, Cuba, Estonia.

Advisory Boards

Head of All-Russia National Council on Applied Educational Psychologists Training

Editorial Boards

Psychological Issues of Moscow State University - member of the Editorial Board

European Journal of Learning and Instruction - member of International Advisory Board (1996 – 2004)

Psychology in the World (Moscow) - member of the Editorial Board

Contemporary Preschool Education (Moscow) – member of the Editorial Board

LIST OF SELECTED PUBLICATIONS DURING LAST YEARS

1. **Mental Development: Looking After New Approaches** (Eds. A.Podolskij, Jan ter Laak, P.Heymans) (1995) Moscow.
2. **On Internalisation Approach As a Tool of Operationalisation and Conceptualisation Of "Developmental Tasks" Paradigm (1995)** In: *Mental Development: Looking After New Approaches* (Eds. A.Podolskij, Jan ter Laak, P.Heymans) (1995) Moscow.
3. **Russia.** In: *International Handbook of Adolescence*, (1995) K.Hurrelmann (Ed.), Greenwood Press.
4. **The Psychology of Image Formation: Subject and Object Dimensions** (1996) In: U. Suojanen (Ed.)“Produkt, fenomen, upplevelse”, Helsinki University.
5. **Western Education and Training Programs in Russia: Psychology of Success and Failure.** (1996) *Paper presented at the Nordic Council Senior Service Seminar.* Copenhagen
6. **Instructional Design for Schooling: Developmental Issues** (1997) In: *Instructional Design: International Perspectives*, S.Dijkstra et al. eds., Lawrence Erlbaum.
7. **Cultural-Historical Learning-Instruction Theories and Real Practice: To Bridge a Gap** (1997). In: *Proceedings of the 2nd International Conference on Cultural-Historical Activity Theory.* Helsinki, Helsinki University
8. **Acquisition of socio-moral, emotional, and intellectual competencies by Russian schoolchildren in schools of Helsinki city.**(1997) *Report on the research project “RUCHIS (Russian children in schools of Finland” presented to the Board of Education, Helsinki City.*
9. **On some psychological contributions to theory and practice of instructional design** (1997) In: P.Kansanen (Ed) *Selected works in educational research.* Helsinki
10. **Approaching real child: slogan, kind intentions, or concrete prospectives?** (1997) Paper presented at the *International Seminar on “Children in Reserach and Testing Situations: Making sense of the intentions of researchers,* Helsinki University.
11. **Adolescent depression and social situation of development** (1998) (in co-authoring with Olga Idobaeva and Peter Heymans). Paper presented at the 6th European Conference on Adolescence. Budapest.
12. **Evaluation and re-design of employment education for demobilized officers in Russia. A case study** (In co-authoring with Cees Terlouw) (1998) “*Life Long Learning in Europe*”, N 1.
13. **Highly Educated Women in the Turmoil of New Working Life** (In co-authoring with Olga Idobaeva) (1999) *Lifelong Learning in Europe*, N 1.

14. **On some risk factors in acquisition of socio-moral, emotional, and intellectual competencies by Russian immigrant schoolchildren in schools of Helsinki city during adaptation period** (1999). (In co-authoring with Olga Idobaeva and Jarkko Hautamaki). Proceedings of the 9th European Congress on Psychology. Rome.
15. **Western Education and Training Programs in Russia: Some Notes on Psychology of Success and Failure** (1999) In: *Proceedings of the International Conference "Transformations and transitions in the Baltic and Barents Sea Area"*. Rovaniemi, Finland.
16. **The Development of an Orientation Base for Assessing the Moral Atmosphere in School** (in co-authoring with D. Brugman) (1999). In: *Proceedings of the International Conference "Moral Values, Character Development and Personal Functioning. University of Utrecht, the Netherlands*.
17. **Depressiveness of Adolescents and Parent-Children Relations under Radical Social-Economic Changes (Russia and Ukraine in the 90s)** (In co-authoring with P. Heymans and O. Idobaeva), (1999). In: *Proceedings of the 6th European Conference on Developmental Psychology. Spetses, Greece*.
18. **Depressed adolescent: Characteristics of social activity** (In co-authoring with O. Idobaeva), (2000). In: *Proceedings of the 8th European Conference of the EARA, Jena, Germany*
19. **Maternal depression and adolescent emotional well-being: Analyzing social interactions.** (In co-authoring with O. Idobaeva), (2000). In: *Proceedings of the 8th European Conference of the EARA, Jena, Germany*
20. **Increasing Adolescent Competence to Perceive School Moral Atmosphere** (In co-authoring with O. Karabanova) (2001). In: *Proceedings of the 9th European Conference of the EARLI, Fribourg, Switzerland*
21. **The provision of developmental support to adolescents: its effectiveness in reducing anxiety and depressive mood.** (In co-authoring with P. Heymans and O. Idobaeva) (2002) In: *Proceedings of the 7th EARA-conference, Oxford, UK*
22. **Perception of moral atmosphere in school and norm transgressive behaviour in adolescents: An intervention study** (In co-authoring with D. Brugman et al.). (2003) *International Journal of Behavioral Development Vol.27, No 4, pp. 289 - 301*
23. **Intervening school moral atmosphere perception: Lessons learned from an empirical study** (in co-authoring with O. Karabanova) (2003) In: *Improving Learning, Fostering the Will to Learn. Abstracts. 10th EARLI Biennial Conference. Padova, Italy. August 26-30, 2003. P. 470*
24. **Galperin's approach as an intervention to develop moral competence.** (in co-authoring with O. Karabanova)// Moral Education within a World of Social, Political and

Religious Cont-roversies. 29-th Annual Conference Association for Moral Education. Jagellonian University, Krakow. July, 2003

25. **Comments from Eastern Europe: T&T Perspectives in Russia** \\ Proceedings of the 2nd International Conference “Teens and Technology: Great Challenge of the 21st Century”, Marbach, Germany, November, 2003

26. **On scientific status of the Gal’perin’s psychological approach.** Hungarian Journal of Psychology, N 4, 2003

27. **Psychological moderators of adolescent emotional development during the period of social change.** Proceedings of the 12th International Meeting of the ISSBD, Gent, July 2004

28. **War and trauma across three generations: The intergenerational transmission of war memories in the former Soviet Union.** Paper presented at the International seminar “The Long Term Impact of War Trauma”, Helsinki,

29. **A school-based community intervention program for prevention and reduction of depression and anxiety.** Proceedings of the ISSBD International Summer School, Moscow, June, 2005

30. **War and trauma across three generations: the intergenerational transmission of war memories in the former Soviet Union.** Paper presented at the International Conference “Using the War: Changing memories of World War Two”, London, July 2005

31. **Russia.** In: International Encyclopedia of Adolescence. 2006

ADULT COGNITIVE DEVELOPMENT ISSUES IN TRAINING OF INDUSTRIAL TRAINERS¹

Andrei Podolskij

Moscow State University, Russia

ABSTRACT

There exists one area of post-gradual education where taking into account the regularities of adult cognitive development is exceptionally important. This is a specially designed training of higher educated and practically experienced industrial trainers to apply psychological-pedagogical innovations in their practical job. To train trainers means to increase their competences to design, to perform and to evaluate the trainees' learning processes in accordance with statements and evidences of contemporary psychoeducational science. Designing a curriculum for trainers' training, one has to bear in mind that industrial trainers (especially those who train high level employees - for example, nuclear power station operators) have their own implicit or explicit ideas about regularities and ways of improvement of effectiveness and efficiency of learning/teaching processes and adult cognition regularities that stand behind those processes.

Accordingly one may select the following “layers” of adult cognitive development regulations analysis in the area considered: 1) Which mental schemes and representations concerning adult cognition and its functioning during learning/teaching processes trainers have; 2) How their schemes and representations correspond with modern psychoeducational knowledge concerning adult learning and teaching; 3) How one may bridge a gap between trainer implicit theories and scientifically based one, using modern knowledge about adult cognitive development and learning

INTRODUCTION

In accordance with the announced aims of the Symposium the recent paper is mostly devoted to the problem of possibilities to apply several psychological ideas about adult cognitive development to real practical issue of industrial trainers' training. The following psychological issues in training of trainers are considered to constitute the problem: (1) psychological aspects of curriculum design for training of trainers; (2) psychological peculiarities of trainers

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as students; (3) psychology of learning/teaching processes in training of trainers; (4) psychological conditions of delivering and implementation of trainers' training results into a real in-company training practice. Psychological aspects of curriculum design are presented as having a high priority.

Such a broad and attractive problem as a problem of "psychological issues in training of trainers" contains a whole number of possible aspects. First of all, it may be considered either as a scientific problem and then studied by a systematic way, or as a practical problem with another accents made. The recent paper is mostly devoted to the practical aspects of the problem mentioned. Certainly, it doesn't mean that scientific aspects of the topic are ignored at all, but rather that applied significance of definite psychological approach will be under consideration.

There are few essential questions, which constitute the problem in its applied aspects. **1st**. What is a main goal of trainers' training? What knowledge and skills should be acquired during training and then used during their own real teaching and training activities? What is a place and a role of psychological knowledge among them? **2nd**. What are the psychological peculiarities of both trainers as students and learning/teaching processes that occur while trainers (beginners or experts) are trained? **3rd**. How to ensure: (a) an acquisition of necessary and sufficient knowledge and skills with prescribed properties ; (b) a guaranteed application of knowledge and skills acquired to real trainers' teaching practice in in-company training; (c) an achievement of (a) and (b) by all the students.

Coming back to the recent paper's title, one may say that there are the following psychological issues of the problem discussed: **(1)** psychological aspects of curriculum design for training of trainers; **(2)** psychological peculiarities of trainers as students; **(3)** place and role played by contemporary psychological knowledge about learning/teaching processes in training of trainers; **(4)** psychological conditions of delivering and implementation of trainers' training results into a real in-company training practice. The above mentioned issues will be considered below with the main emphasis on the first issue.

1. PSYCHOLOGICAL ASPECTS OF CURRICULUM DESIGN FOR TRAINING OF TRAINERS

Discussing the recent issue one has to bear in mind that trained trainers represent a very specific type of students – they are, as a rule, theoretically sophisticated and practically experienced and skilled in performing of appropriate professional activity they are expected to teach and train the employees. To train the trainers is to teach them (or, at least, to improve existing competences) to design, to perform, and to evaluate teaching and training processes in accordance with statements and evidences of contemporary instructional science. It means that the main and most important aim of the curriculum for trainers' training is to provide them with effective, fruitful and powerful "instructing tool" that would enable them to execute the employer's orders concerning personnel training and retraining. Designing such a curriculum, one has to bear in mind that industrial trainers (especially those who train and retrain high order operators - for instance, nuclear power station operators) are far not "*tabula rasa*", and have in no doubt their own (at least, intuitive) ideas about regularities and ways of improvement of learning/teaching processes. Sometimes it helps, sometimes, by contrary, prevents from performing the initial course ideas; however this is a reality that should be taken into account while designing such a course. It means that a training course being suggested the trainers has to be sufficiently flexible to satisfy a variety of initial psychological-pedagogical levels of the students' knowledge and also sophisticated enough to demonstrate them the psychological fundamentals of learning/teaching processes to represent something more than the intricate words only. The students have to "open" themselves in the direction of the new material presented, to evaluate it as a really new and useful for them, and, accordingly, to accept it as a "tool". In addition I'd like to mention one permanently repeated fact: our students were extremely attentive and sensible towards if a content and a manner of trainers' training course performing firmly corresponded with the principles, fundamentals and educational technologies proclaimed and accordingly were recommended them to use in in-company training practice; that is they considered their own actual learning experience as a "touchstone" for the theories and procedures suggested by the teacher. Thus designing a curriculum one has to bear in mind all the complexity of adult and experienced learner's personality.

Below we shall consider our experience to design and use a definite kind of trainers' training curriculum which has been initially elaborated as early as at the beginning of 80s and has been tested many times in a number of training centers of the former Soviet Union specialized

to train and to retrain the high-level personnel of heat and nuclear energy, color metallurgy and of other fields of industry as well as in a number of a special institutions for industrial and military trainers' training (see: Podolskij, 1992).

1.1. On general structure of curriculum for trainers' training.

To satisfy such complex and sometimes contradictive demands, trainers' training course curriculum has to be **scientifically based** (that is to give the students significantly more than their own common sense and empirical experience might give) and **practically directed** simultaneously. Training course consists of two parts: theoretical and practical. Theoretical part is devoted to classroom learning and group discussion of a definite set of fundamental problems, such as a specificity of human activity being compared with intelligent computers, a nature of human learning and teaching of human being as well, a central role of human mental activity formation in vocational training and retraining improvement, etc. Those general questions are studied and discussed during a *first stage of theoretical part*; the last consists of three sub-stages.

The *second stage of theoretical part* is devoted to studying and discussing much more professionally oriented questions such as psychological structure of operator's activity; ways and means of the operator activity formation's managing; strategy and tactics of different training classes design and execution; optimum manners of functional and full-scale simulator using, etc.

If the **theoretical** part of the course has to provide the students with general and specialized *knowledge and representations* about a nature of events and regularities under considerations, the **practical** one is designed to ensure them to acquire a set of quite practical *skills* directed both to design and to conduct different types and kinds of classes (theoretical, quasi-practical, practical), to design the whole specific subject matter courses, or their parts, to design and to test the sophisticated software etc. (see: Podolskij., 1992).

It is clear that such complex and heterogeneous (both objectively and psychologically) training course structure presupposes a presence of generalizing background, a framework that might enable the student to grasp a problem field from a comprehensive, sophisticated, and simultaneously practically oriented standpoint. In other words, such course needs a powerful intellectual tool to underlie and to ensure the students' holistic and systemic

attitudes, knowledge, and skills formation. In opposite case, when students were not provided with such a tool, as our experience demonstrated many times, they were beginning to mix up uncorresponded, hence, senseless concepts and statements and, as an obvious and natural final result, to refuse (either externally, by their behavior and judgments, or internally; the last was also hardly difficult to discover) to attend the course as unpractical and vain.

1.2. "Formation of mental action" approach as "cornerstone" of knowledge base for trainers' training course curriculum design

Two different aspects of learning/instruction knowledge consideration exist as related to the problem of instructional design (in particular, curriculum design) knowledge base. **First.** What kinds of scientific (mostly, psychological, sometimes psychophysiological, sociological, a.o.) information relating learning processes and results should be taken into account.

Radical changes in approaches to a content of instructional design (ID) knowledge base, taking place during last two decades, are very well known and continue to attract attention of scholars and practitioners; thus there is no need to discuss these changes in details here. To summarize, this is an emphasis on *active* and *constructive* nature of learner's performance, on *meaningfulness* as important condition of learning productivity, on leading and determining role of *internal* (vs. external, behavioral) parts of learning processes such as *cognitive and metacognitive strategies, mental schemata*, etc. Accordingly a main task for a new generation's instructional designer was claimed to be *a creation of powerful and effective learning environments*.

Accepting above mentioned, in no doubts, positive trends, I'd like to touch upon the **second** aspect of learning/instruction knowledge base consideration. In what extent knowledge presented is operationalized, i.e. differs from pure theoretical, sometimes metaphorical judgments, and is prepared to become a real base for designing and, further, for teaching and training to design. It is a hardly simple job to prescribe definitely and, therefore, to succeed finally in designing of hidden internal, mental structures being resulted of also internal and mental (however, very active and constructive) processes taking place "in a learner's head". A contradiction between, on the one hand, an externality, an obligation, a compulsiveness of the ID prescriptions and, on the other hand, an internality and spontaneity of the designed processes' nature is, indeed, a critical point of the topic. Thus, modern instructional designer (as well as scholar) seems to be squeezed between Scylla of strict ID's demands and

Charybdis of up-dated psychological and instructional evidences. As my own and my colleagues' more than thirty year experience shows there exists the approach where the above formulated requirements for IDS' intellectual tool are met by in the sufficiently complete, sophisticated and operationalized manner to be underlain the "manufacture" of the tool. It is the approach advanced by Russian psychologist *P.Galperin* (1902-1988) and known as "**Formation of mental actions" approach** (Galperin, 1957, 1969, 1975, 1989, 1992, a.o.).

This approach continues and develops the well-known Vygotsky' trend in developmental and learning psychology and, at the same time, represents a totally original doctrine, which describes the essence of human mental life on philosophical level, its coming into existence and development in the context of philogenetical, anthropogenetical, and ontogenetical processes, as well as a very concrete "system of psychological conditions" (as it was named by P. Galperin himself), enables knowledge and skills formation with the desired and prescribed properties. In accordance with this approach a human mental action is a unit of goal-directed, meaningful, socially- and tool-mediated and developing human activity.

According to P. Galperin, human (mental) action is described as a functional structure formed in one's lifetime and aimed at structuring of various problem situations the human being encounters to, as well as at planning, and regulating of the activity by means of socially established patterns, standards and evaluations. Mental action can and should be considered as a result of the complex multimodal transformation of initially external processes performed by means of certain tools, thus being the result of internalization (Galperin, 1967). Mental actions and images reflect, and are the product of both human needs and the demands and conditions of the objective situation. They can, therefore be characterized by a set of primary and secondary properties. The following properties are considered to be *primary*: (a) the composition of the action's objective content; (b) the extent of differentiation of essential elements of problem situation from non-essential elements within the problem situation; (c) the degree of internalization of the action; and, (d) "energetic" (speed and enforcement) parameters. *Secondary* properties are: (a) reasonability; (b) generalization; (c) consciousness; and (d) criticism. The secondary properties are the result of specific combinations of primary properties. Both primary and secondary properties represent socially estimated and evaluated qualities of human activities, and refer to any sort of activity, whether individual or collective, material or mental.

The final values of these properties determine the specific action and/or image that are formed. Galperin considered the values of the properties to be the direct outcomes of action formation conditions. He therefore defined a system of conditions that ensure and guarantee the achievement of prescribed, desired properties of action and image; this system is termed the “**System of planned, stage-by-stage formation of mental actions**”, or the **PSFMA system**.

The PSFMA system includes *four subsystems*: (1) the conditions that ensure adequate motivation for the subject's mastering of the action; (2) the conditions that provide the formation of the necessary orientation base of action; (3) the conditions that support the consecutive transformations of the intermediate forms of action (materialized, verbal) and the final, end-transformation into the mental plan; and, (4) the conditions for cultivating, or "refining through practice", the desired properties of an action (Galperin, 1989). Each subsystem contains a detailed description of related psychological conditions, which include the motivation and operational areas of human activity.

The *first* subsystem (conditions for motivation) makes explicit a number of links and connections between learning motivation and the dynamics of the internalization processes.

The *second* subsystem (conditions for orientation) contains a description of hierarchically organized components which together offers a framework for the formation of a concrete action and provides a learner with the conditions for an adequate ("complete", by Galperin) orientation within a problem situation. Those components are the representations of the subjective and objective characteristics of a problem situation and taken together were termed by Galperin the “complete orientation base of action” (Galperin, 1992). The structure of complete orientation base of mental action contains: 1.Representation of the final product of an action; 2.Representation of intermediate products; 3.Representation of the general plan for achievement of the final product; 4.Representation of plans for achievement of the intermediate products; 5.Representation of tools used to achieve those products (both orientation & execution tools); 6.Representation of the plan and tools for control and correction of actions as they are being executed; 7.Representation of the entire structure of a complete orientation base of action (Galperin, 1992). It is hardly difficult to discover a familiarity of the representations forming an orientation base and functional descriptions of mental models of different types. One may add that *three* psychologically different but

interconnected *levels of orientation base* may be distinguished: 1) *executive orientation base* that is a scheme of human orientation in *how to do*; 2) *goal orientation base* that is a scheme of human orientation in *what to do*; 3) *sense orientation base* that is a scheme of human orientation in *why (what for) to do*. There are both ascending and descending affections of different level orientation base to each other: human understanding how to do reflects upper level sense and goal representations, and vice versa the formers are affected by possibilities and features of execution or sense and goal coming into existence (Podolskij, 2003).

The third subsystem represents the stages of internalization, or transformation of the action into a mental plan. Galperin has introduced *six stages of internalization* as the fundamental base of any learning process: 1. Formation of a motivation base of action; 2. Formation of an orientation base of action; 3. Formation of the material (materialized) form of action; 4. Formation of the external socialized verbal form of action (overt speech); 5. Formation of the internal verbal form of action (covert speech); 6. Formation of the mental action; final changes, the action's automatization and simultaneouzation Galperin, 1992).

The fourth, subsystem contains a description of the three base problem situation types and of their combination and presentation during the formation processes. Three basic types are distinguished: (a) the "*psychological*" type in which the conceptual and perceptual or visible features of a problem situation are opposed; (b) the "*logical*" type, in which necessary and essential parameters are contrasted with unnecessary, or "noisy" parameters of a problem situation, and (c) "*object*" type, in which all the possible forms of a specific action object content are varied. Different problem types are offered in a sequence which is meaningful for learners (Galperin, 1989).

If the four subsystems harmoniously work together, they produce an action with the desired primary and secondary properties.

To describe the frames of that approach generally in terms accepted by contemporary instructional design scholars, one may say that: (a) *instructional content* is presented as a set or a system of interconnected actions, concepts and representations planned to be formed; (b) *goals of instruction* are defined and specified in terms of action parameters; (c) *instructional plans* are elaborated as didactic projections of stages of formation; (d) *learners'*

characteristics are first considered in terms of the students' motivational and cognitive readiness to acquire projected mental actions and concepts.

The procedure of the **PSFMA** in the most generalized form may be described by the following way. On the *first stage* the subject's initial attitudes towards the goals and objectives of the forthcoming process as well as towards the concrete learning/teaching situation are being constituted; of course, these attitudes may change during formation process. On the *second stage* the scheme of orientation base of action is elaborating; that is a multilevel system of cues, marks and signs, guided by which the subject constructs, explores, reflects and perform the action being formed, is defined. Extent of autonomy of the subject to construct such the scheme may vary from a full dependence on a teacher to an almost full independence; it is a function of aims and goals of the concrete learning/teaching process as well as of the learner's peculiarities. A value, sense, goal and executive learner orientation's harmonization should be ensured; in an opposite case a whole set of negative consequences are expected to come either during formation process or after it when a new-formed action would begin its own being (Podolskij, 1997).

General macro-structure of this scheme is relatively indifferent to the peculiarities of the action's special domain content as well as to if the action being formed is the beginner's or the expert's action. The most essential differences will appear as early as one starts to compare concrete specifications of each element of the concrete orientation schemes in the beginners and in the experts. The macro-structure is also relatively indifferent to kinds and sorts of actions are to be formed: if they are concrete specific domain actions, or actions belong to cognitive meta-strategies, or actions that underlie the heuristic methods, etc. The general function of the scheme is to provide the learner with a powerful orientation means, or tool, which enables him to plan, to direct and to control solving any kind of problems related to the field planned (see above concerning the fourth sub-system of conditions). It should be emphasized that in general **such scheme is not an "algorithm"** for solution (although in *some cases* and under *definite conditions*, *few learners* really need several kinds of "algorithmic prescription"; but it is an exception rather than a rule). The process of its constructing may become a real creative task for both participants of learning/teaching interaction - for student as well as for teacher. On the *third stage* the learner begins to solve different tasks organized and presented in the definite order and manner (see above about the *fourth* sub-system) using the scheme of orientation basis of action being elaborated on the second stage. Again, the initial form and the peculiarities of the scheme may be quite different

and vary from detailed descriptions of an order and a content of operations that should be performed to the very general notes and heuristics. Concerning an external view of the scheme it may be the scheme in a proper sense, or a "solution tree", or a text, or a picture, graphic, formula, presenting either as a whole, or part by part, or hierarchically, using multi-screen etc. Such a view should be defined quite concretely in dependence on three variables just mentioned above: action's objective content, teaching aims, learner's individual peculiarities.

The constancy of the action's essential structure enforced by verbally reasoned solving of specially designed and collected different (see above) problem situations leads to the point when it is not necessary for the student to resort the scheme as the material thing. In some time its main content (see above concerning second sub-system) is fully represented in the subject's *socialized* (that is understandable for other persons) *speech*. The latter becomes the base of the newly forming action.

Thus the action transfers to the *fourth* stage of formation - of the external socialized speech plan. Because of solving the varying set of problem situations the so called "melting" of the external phonetic form of speech takes place. It is a main content of the functionally intermediate *fifth* stage of action formation: formation of action's internal verbal mode.

Accordingly, on the last, *sixth* stage of formation the mental action passes through final changes and begins its own "psychological life", that is becomes able either to be included in other psychological structures enriching them or to include similar structures in itself to be enriched and developed.

Thus as a result of stage-by-stage formation the initially externally mediated and successive action appears to be transformed into a "pure mental act": on estimating the problem situation a learner takes a decision on the spot.

Being predetermined by designing and performing four sub-systems' requirements, the results of planned stage-by-stage formation closely correspond with the most desirable aims of contemporary Instructional Design Movement: acquirement of generalized, meaningful, synchronized knowledge and cognitive skills appears to be a result of authentic student's learning activity transformations.

Since late sixties a significant number of works (both research studies and practical applications) tried to use PSFMA approach to improve vocational training processes and results was appearing. The *activities* of different level from many fields of industry (energy, electronics, metallurgy, chemical technology etc.) and military forces as well as *psychologically heterogeneous structures* were becoming the objects of planned stage-by-stage formation: separate specific domain mental actions as well as connected with them concepts and representations; groups and even systems of such actions and concepts; actions underlie cognitive/metacognitive strategies and heuristics; fragments of real professional activities and entire activities.

As it has been convincingly demonstrated by a big number of applied studies, a whole set of main objectives that any teaching (or training) is aimed at could be fulfilled: (1) the *guaranteed acquisition* of the course by *all the learners* (all, of course, who have the necessary level of preliminary knowledge and skills) without prolonging (sometimes - even with reducing) of the time allocated to it, and practically without any additional costs (again, sometimes, with reducing, especially being reasoned by a more rational use of simulators and imitators); (2) *the division* into the acquisition of knowledge and its applying *is minimized* or wholly disappears; (3) the learners acquire *abilities to transfer* to a new situation not only knowledge and skills being formed but also the way of acquisition them and the general manner of thinking; (4) being aware of these new formed abilities the learners get *more and more interested* in the very processes of acquiring knowledge and in knowledge itself.

Giving an appropriate evaluation to these encouraging results, one has to say that they, as everything, have a reverse side: sometimes the serious *misunderstanding* concerning the status of the Galperin's approach appears. Thus, the approach is interpreted not as a general description of laws and regularities that may explain the concrete dynamics and results of human mental (in particular, professional) activity formation, but rather as a set of technologies and prescriptions "how to teach". Such interpretation, indeed, distorts the reality and transforms the approach to some "absolute" knowledge, like a sort of "philosophers' stone". It is clear that the heterogeneous structure of a real learner's orientation in action's problem field, in instructional situation as a whole, the non-linear character of action's orientation formation (see: Podolskij, 1993, 1997, 2003, a.o.) does not allow to speak about an application of any constant, so to speak, "absolute" planned stage-by-stage procedure, or

technology of instruction, which is implied by the PSFMA. To repeat once more: a sequence of stages, a general structure of orienting basis of action and other "cornerstone" elements of the planned stage-by-stage formation system mentioned above should be considered as the most complete, normative and, nomothetical description of human mental action formation process. (Galperin, 1992).

The fragments of the PSFMA procedure are not something absolute and, in this sense, external in respect to the concrete peculiarities of a learner and of a teaching/learning situation. (Podolskij, 1997, 2008). Thus, successful application of the statements of PSFMA presupposes not a *literal reproduction* of some abstract general procedure, but a *creative designing* a system of necessary and sufficient psychological conditions being adapted to a concrete training situation. Hence, the case in point is the elaboration of such a procedure occupying an intermediate position between the fundamental psychological knowledge and the real process of training, which could make it possible to take into account and to link, on the one hand, the general laws and regularities of formation of learners' mental activities as the nuclear part of any learning/teaching process and, on the other hand, the concrete individual- and social-psychological characteristics of learners as well as concrete characteristics of practical training situation.

It is this aim which is pursued by the consecutive elaboration of **three models of instructional situation**: *psychological, psychological-pedagogical and procedural, or technological model*. (Podolskij, 1993, 1997, 2008).

The psychological model includes: (1) the modeling of knowledge and skills planned to be acquired as a set (a system if possible) of definite learners' mental actions and concepts; (2) description of macro- and microstructure of learner's orientation of various levels which should underlie new-formed mental actions; (3) the description of age-related- and individual peculiarities of students with the degree of specification necessary for the concrete situation of schooling; (4) project of the system of psychological conditions to provide a formation of the actions with planned properties as well as their unification into the integrated activity in accordance with students' peculiarities. It is clear that in different concrete cases the accents should be made on different constituents of psychological model.

The main function of the **psychological-pedagogical model** is the projection of psychological model's demands to concrete objective and subjective conditions of school teaching: organizational forms of conducting teaching and their distribution during a lesson or couple of lessons; proportions of classroom- and home works (if any), individual, small group and collective forms of learning activities; available technical aids of teaching (including computers when necessary) and their desired facilities, etc

The last, **procedural, or technological model** of instructional situation includes detailed description of the process of teaching with distribution of classes according to form and time with precise description of the goal of each class' fragment and means of its goals achievement. It also includes a complete list of training methodological documentation: schemes, different kinds and types of both learning/training and checking tasks, descriptions of the order of application of technical aids, and a number of other materials specified for different types and kinds of schooling instructional situations. Being considered formally the methodical model looks like traditional well-done "teacher's lesson plan"; but one has to remember that such inventory is going along the channel outlined by the psychological and psychological-pedagogical models.

Considering three-model scheme it is necessary to understand that we deal with an intellectual tool again. It is not an algorithm that prescribes "how to act". This scheme used by an appropriate and sophisticated way gives a designer and a trainer a chance to orientate, to plan, to control him (her) self completely and correctly in designing, arranging and performing different instructional situations. The more experienced and skilled a trainer is, the more closed and interconnected inter-model links are in his (her) head. It is an interesting task for the future to design a trainer's learning activity directed to acquire knowledge and skills (or in the terms used, definite mental actions) to use such approach practically. A limited experience in this respect exists, but it needs to be extended and broadened.

Thus curriculum for our students-trainers is designed to give them a possibility: (a) to learn about this approach as a base for improvement a training process and its results; (b) to discuss its advantages and lacks, strong and weak sides; (b) to compare it critically with other, alternative approaches belong both to different scientific schools and to the students' own empirical (professional and everyday life experience; (c) to evaluate the ways and difficulties

of its real practical application to design and perform different kinds of in-company training: initial training, anti-accident training, refreshing and up-grading training, etc.

2. PSYCHOLOGICAL PECULIARITIES OF STUDENTS: TRAINERS AS STUDENTS

All the essential statements pointed out concerning adult learning and instruction are completely applicable and suitable for that special type of students as represented by trainers being trained. Trainers as learners demonstrate an active and constructive character of learning processes; well-known types of knowledge representations as well as their mental models are clearly discovered; trainers are undoubtedly self-directed learners who actively participate in creating of learning environments. Typically the trainers considered were 35-50-year old men with relatively long teaching/training experience; correspondingly the age-related peculiarities are also completely presented as well as individual-psychological ones. However there existed one essential peculiarity, which corresponded directly both with trainers' educational background and with their past professional experience. It was a general total "technocratic" directedness of trainers' professional concepts and attitudes. As special psycho-diagnostic study has shown more than 80 % trainers participated our studies training procedure (nuclear power station training centre instructors were the subjects) initially (before attending our course) were not only unfamiliar with modern trends and achievements of instructional psychology and educational technology, but moreover they were absolutely sure that such sphere of human cognition doesn't exist at all. They made very strict critical evaluations of any educationalists' efforts (even without any ideas what these efforts were done) and insisted on the increase of simulator and imitator facilities as the only serious way to improve the results of nuclear power station operator training (see: Podolskij, 1992). It is necessary to add that about 70 % of trainers had a sincere firm believe that there were no serious differences between human learning and "learning" of self-programming intelligent computers (*ibid*). We have collected a multitude of similar examples demonstrating a lack of initial psychological-pedagogical background of the trainers trained.

It is quite clear that these characteristics of the students had to influence significantly the forms and manners of training course conduct.

3. ON PSYCHOLOGY OF LEARNING/TEACHING PROCESSES IN TRAINERS' TRAINING

To influence the initial trainers' attitudes it was not possible to start with a direct appeal to trainers' own experience: they showed themselves to be much closed to have a serious discussion about psychological-pedagogical topics. Their external reasons why they refused to be involved into discussion were surprisingly similar those presented by G. Snelbecker (1987) related the school teachers' unwilling to learn and to use instructional science findings and advices: "I don't need any help in teaching/training", "I am already doing that you might advice", "If I use that theory I'll have to change my teaching methods completely", "I already know those theories" etc.

Thus we had to start from the topics seemed to be far from operator training problems. General discussion about ways and means of learning/teaching processes was used as a starting point. As our experience showed, the most fruitful and stimulating beginning deals with schooling problems (most trainers had school-age children). A specially designed and selected problem situations from school and everyday life have been suggesting to the students; they were asked to evaluate the situations, to give possible solutions how to improve learning/teaching processes and results. Then the teacher (University psychologist) compared the students' solutions and those that were made on the base of scientifically elaborated methods. As usual such analysis ended with the "insights" of the students who opened for themselves a quite new sphere of scientific thinking having the obvious advantages. Only after that we got an opportunity to move further and to discuss some general theoretical questions (about a nature of human learning, its specificity being compared with animal learning, a system of psychological conditions of effective and efficient knowledge and skills acquisition, etc.).

As it was mentioned above, we tried to use the same principles both as a main content of training course's theoretical part and a manner of this part's learning and teaching. Thus we intended to organize a system of necessary and sufficient psychological conditions (see above) aimed: (1) to form and to develop a hierarchically constructed students' orientation (value, sense, goal and executive orientation) in a field of psychological-pedagogical knowledge; (2) to ensure a stage-by-stage transition of initially materialized, external students' orientation to mental plan (different forms of schematization, discussion, problem solving were used); (3) to provide a trainer's renewed orientation with such desired properties as reasonability, generalization, criticality, etc. (see above). We never first attracted students'

attention to the similarity (or, at least, closeness) of the course content and current training procedure; as usual, we waited for this to be realized by the students themselves. And they, as a rule, did. Of course, it again had a view of "insight", and the teacher was pleased to be happy together with the students who made such "discovery".

It is hardly difficult to suppose that those "discoveries" played a role of "motivational explosion", after which a natural transition to the second stage of the training's first part took place. As usual, initial "psychological barriers" appeared to be broken down, and more or less the same procedure (forming of orientation, its internalization and providing with the properties desired) was conducted, but now as related to more special topics devoted to concrete problems of operator's professional activity formation, training and development. And here we had a lot of students' "insights" again: they began to try the ideas and statements discussed during the first stage of theoretical part to the realities of their own professional life and - they wondered! - to find those to be suitable and applicable.

It was a starting point for the training's **second part** beginning. Its main content consisted in an individual or small-group project making. Project goal was to work out either a general framework of operator training course curriculum, or a concrete theme elaboration (including preparation of a set of training materials), or a creation of a renewed software to be used in one or another part of operator training (retraining) course, or anti-accident training scenario, or even a producing the holistic methodology of simulators and imitators usage. In any case the student had to present the project made and to defend it during specially organized public defense procedure.

It is important to stress that in the second part of training course, as well as in its first part, the same general content directed students' search and constructing activity; our students really created their new knowledge and skills (certainly, in a closed collaboration with a teacher and with each other). They didn't play a role of "pupils" or even of "apprentices".

The second part of training was organized as collaboration of a psychologist (who knows more about learning/teaching processes in general and less about concrete peculiarities of operator training process) and a trainer (vice versa). It is clear that such a manner to conduct practical classes was highly appreciated by our students.

4. ON PSYCHOLOGICAL CONDITIONS OF TRAINERS' TRAINING RESULTS APPLICATION IN REAL IN-COMPANY TRAINING PRACTICE

Anyone who is experienced to apply instructional innovations knows very well that to elaborate a procedure, to prepare teaching/training materials and new software is less than one half of the practical problem solution. Another, and may be psychologically more difficult half consists in preparing (more often, in changing) the auspicious social psychological environment to enable to apply the innovations. This problem has a multilayer character, thus I will shortly touch here upon only one important side of it. It regards to top level managers' understanding and acceptance the idea of instructional innovation as such, their agreement with probable changes of personnel training content and order, and also with a necessary increase of preparation part of trainers' working day. Sometimes, as my practical experience shows, it comes into conflict either with these or those manager internal motives, or with his initial representations and prejudgments about in-company training.

Any serious real practical training innovations caused by trainers' training results certainly presuppose that a high level manager is able to consider such innovations from a systemic point of view, in the context of complex interconnections of economic, technological, social, and psychological aspects of the enterprise performance. And it is a hardly simple task to argue him a high priority of training innovations being compared with other sharp enterprise's problems. One might add the same difficulties of understanding and acceptance caused by technocratic attitudes, similar to those we met in our students during the first phases of the training process.

The most direct way to solve such problem solving is a coordination of both top level managers' and trainers' training, when a content and conducting of training procedures are internally concerted, and directed from a general standpoint, which is sufficiently sophisticated and comprehensive. To solve this task one has to have specially designed coordinated (but not similar!) curricula and also strongly linked training strategies. We collected some experience of such coordinated job being made by Moscow State University psychologists together with practical psychologists and trainers employed by nuclear and heat

energy enterprises. Procedures, insights and results achieved give us a hope but need to be extended and intensified.

REFERENCES

Gagne, R.M. & Merrill M.D. (1989). Integrative goals for instructional design. *ETR&D*, 37 (1), 23-30.

Galperin, P.Ia. (1957). An experimental study in the formation of mental actions. In B.Simon (Ed.), *Psychology in the Soviet Union*. London: Routledge & Kegan Paul. pp.213-25.

Galperin, P.Ia. (1969). Stages in the development of mental acts. In M.Cole & I.Maltzman (Eds.) *A Handbook of contemporary Soviet Psychology*. New York/London: Basic Books. Pp. 249-73.

Galperin, P.Ia. (1975). Changing teaching methods is one prerequisite for increasing the effectiveness of the schooling process. *Soviet Education*, 17 (3), pp. 87-92

Galperin, P.Ia. (1989). Organization of mental activity and effectiveness of learning. *Soviet Psychology*, 27 (3), 65-82.

Galperin, P.Ia. (1992). Stage-by-stage formation as a method of psychological investigation. *Journal of Russian and East European Psychology*, 30 (4), 60-80.

Merriam, S.B. & Caffarella, R.S. (1991). *Learning in adulthood*. San Francisco: Jossey-Bass.

Pieters, J.M. (1993). *Adult learning and instructional design*. Syllabus. 194505. March 1993. University of Twente, Enschede.

Podolskij, A.I. (1990). Cases, simulations, games and the formation of mental action: Galperinian perspective. In H. Klein (Ed.), *Proceedings of the 7th International conference of WACRA*, Waltham, MA: Bentley College Press, pp.535-539.

Podolskij, A.I. (1992). *Psichologičeskije problemy obuchenija specialistov na proizvodstve* (Psychological problems of industrial personnel in-job training), Moscow University Press, Moscow.

Podolskij, A.I. (1993). Psychological theory as base of instructional design and as part of curriculum in post-graduate education. In C.Terlouw (Ed.) *Instructional development in higher education: theory and practice*. Thesis Publishers, Amsterdam, pp. 63-78

Podolskij, A.I. (1997) Instructional design for schooling: Developmental issues. In: Dijkstra, S. et al. (Eds) *Instructional design: International perspectives. Volume II* Mahwah, NJ: Lawrence Erlbaum Associates. pp. 289 - 314

Podolskij, A.I. (2003) On scientific status of the Galperin's psychological approach. *Hungarian Journal of Psychology*, N 4, pp. 78 – 96.

Podolskij, A.I. (2008) Bridging a Gap between Psychology and Instructional Practice: Toward applied Model-Based Theory Construction. In: Ifenthaler, D., Pirnay-Dummer, P., & Spector, J. M. (Eds.). (2008). *Understanding models for learning and instruction. Essays in honor of Norbert M. Seel*. New York: Springer, pp. 211 – 223.

Snelbecker, G.E. (1987). Instructional design skills for classroom teachers. *Journal of Instructional Development*, 10 (4), 33-40.