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с позиций культурно-исторической
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from the Perspective of Cultural-Historical
Psychology

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Foreword

The authors of this issue are mainly represented by the speakers of the International Congress "L.S. Vygotsky and A.R. Luria: Cultural-Historical Psychology and Issues of Digitalization in Social Practices", which was held in November 2022 at Novosibirsk State Pedagogical University. It was co-organized by the Moscow State University of Psychology and Pedagogy. The theme of the congress is also defined by the theme of the issue. But the content of the issue is not presented by the texts of the reports of the participants — the relevant materials are published separately. We approached a number of speakers with a proposal to write articles within the framework of the Congress theme and we are glad that they responded to our proposal. This issue can be regarded as a kind of "congress meeting after the Congress".

The theme of this issue is "Studies of the modern infosphere from the perspective of cultural-historical psychology. Why is it formulated this way? Why do we speak not about the usual "computerization", "informatization", "digitalization", "digitalization", "virtualization" in the sphere of social practices, but exactly about the infosphere in which culture, society and man, who create what they live and develop, are not simply represented but live and develop? This is not just because everything that can be said about them in general terms has already been said. These are all special, private, applied, "instrumental" aspects of a much more serious and fundamental problem for the family of human sciences.

The introduction of the term "infosphere" is commonly associated with the name of the American economist, sociologist and poet Kenneth Boulding. He spoke of six spheres — sociosphere, infosphere, biosphere, hydrosphere and atmosphere. Of course, he is not original here. The classical "sphere" geoplanetary construction of Leroy-Teillard de Chardin-Vernadsky is easily recognized. The presence of the noosphere, within which the other "spheres" are transformed, makes the Earth a planet of people, where nature becomes part of culture, and not vice versa (V.I. Vernadsky). The temptation to consider the infosphere as a component of the noosphere, the sphere of the mind, is great. But in practice we observe the divergence of "thinking" and "information", noted by cybernetics in the 1950s and 1960s and well known to psychologists. Another matter is that this divergence is not absolute, but concrete-historical. And the key to its analysis should be sought not in the field of IT, but in the field of philosophy, psychology, all "human knowledge" (F.T. Mikhailov). For the simple reason that it is thinking that gives meaning to information, even if it has managed to become generally meaningful, since its functionality and effectiveness has been confirmed more than once and everywhere. It is sufficient that "it works". Unthinkable things "work" in the 21st century! Unthinkable and inconceivable. Meaning is ripened and formed leisurely, through a chain of difficult reconsiderations, which do not lead directly to a "re-cognition" of human achievement. The more grandiose the "sum of technologies" (Stanislav Lem), the more difficult it is to comprehend and therefore sooner or later becomes uncontrollable, unmanageable, confronting and even threatening human freedom. Of course, through this, man and humanity "figure things out" with themselves and with themselves alone. "The revolt of the machines" under the name "robots" first, a century ago, artistically described in the play R.U.R. (1921), whose author, Karel Čapek, coined the word "robot", is the inner conflict of humanity and man.

Nowadays it is common to talk about "challenges", such as "digitalization challenges". But who throws them to us, who "summons" us, whom do we "call for help"? Apart from the problem of man's self-relation in culture, the problem of man's subjectivity, there is no other problem here. Cultural-historical psychology accepts this challenge because it devoted itself entirely to the study of this problem long before the emergence of IT. By the way, IT, which it regards as a special cultural toolkit for "mastering activity" (Y.V. Gromyko), and in activity — oneself, can also be discussed from its position not only in terms of general intentions. It has almost forty years of concrete research history behind it. (See the works of M. Cole's teams in the U.S.A. and V.V. Rubtsov in in the U.S.S.R. published as early as the 1980s, which have influenced the development of this theme in psychology and set the tone for corresponding innovations in education).

It was this logic that guided the discussion at the Congress, and which is also followed by the authors of this issue.

In conclusion, we would like to thank Tatiana Eduardovna Sizikova, Candidate of Psychological Sciences, Associate Professor of Correctional Pedagogy and Psychology at the Institute of Childhood, Novosibirsk State Pedagogical University. She has done a truly Herculean job as the organizer of an interdisciplinary scientific forum unprecedented in its scale, composition of speakers, and scope of the participating countries. She also played a leading role in the preparation of this issue of the journal.

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THEORY AND METODOLOGY
ТЕОРИЯ И МЕТОДОЛОГИЯ

Brain. Thought. Word

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The real test of long-term value for any scientific theory is when that theory encounters phenomena that did not exist at the time it was created. Such a test situation for cultural-historical psychology is happening today, in the era of the digital revolution. This article attempts to show the results of this test with a very important caveat: both the digital revolution itself and the studies of its consequences are currently in the process of rapid development, and a general overview can only be preliminary.

Keywords: the digital revolution and cultural-historical psychology, digital media and the brain, brain signals and thought, direct «mind reading».

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Мозг. Мысль. Слово

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Настоящим тестом долгосрочной ценности для каждой научной теории является ситуация, когда эта теория сталкивается с феноменами, которые не существовали во время ее создания. Такая тестовая ситуация для культурно-исторической психологии происходит сегодня, в эпоху цифровой революции. В настоящей статье предпринимается попытка показать результаты этого теста с очень важной оговоркой: и сама цифровая революция, и исследования ее последствий на данный момент в процессе бурного развития, и общий обзор могут иметь лишь предварительный характер.

Ключевые слова: цифровая революция и культурно-историческая психология, цифровые медиа и мозг, мозговые сигналы и мысль, непосредственное «чтение мысли».

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Digital Media and the Brain

Two concepts provide insight into the profound meaning of the digital revolution. The first is by the Canadian media philosopher M. McLuhan. His ideas are summarized in the famous statement "The medium is the message". The main idea: in every media the main thing is not its content, but the nature of media.

Vygotsky formulated these ideas much earlier and in greater depth in his statements on the role of the tool in the development of higher mental functions. Vygotsky expressed the problem of the role of the tool (cultural tool, cultural-psychological tool) more than once in different works and in different years (especially in the text "Instrumental Method in Psychology").

Continuing K. Marx's idea that culture is the "inorganic body" of the person, Vygotsky formulates ideas that mental development represents not only what is in the individual, but also what is embodied in cultural-psychological tools (language, written language, a system of scientific notions, various techniques and technologies - which serve as support, an instrument in the individual's mental processes).

These cultural tools are accumulated in the course of history, and this is the essence of cultural-historical development of human consciousness under relatively constant morphology of the brain of Homo sapiens.

In the light of such Vygotsky's theory it seems productive to attempt an analysis of the nature and role of digital media. Here is how Vygotsky expresses relevant ideas. "The use of psychological tools enhances and expands behavior immeasurably, making the results of the work of geniuses available to all..." [1, c. 125]. And further: "The inclusion of a tool in the process of behavior, first, causes in the activity a whole range of new functions connected with the use of this tool and with the management of it; second, it cancels and makes unnecessary a whole range of natural processes whose work is done by the tool..." [ibid].

So, if digital media are one of the cultural-psychological tools, Vygotsky's quotes say it all: they immeasurably expand the possibilities of behavior, cause a whole range of new functions, make unnecessary a whole range of processes whose work is done by the tool (here Vygotsky seems to be alluding to artificial intelligence and machine learning!). And this is the grand role of the digital revolution in modern society, and Vygotsky's theory is the key to understanding this new phenomenon. If the nature of this phenomenon can be understood in the light of this theory, it seems impossible to predict a foggy future in virtual reality.

Most important for psychology is research into the effects of digital media on the mental development and functioning of the individual.

Often the use of digital media, especially at an early age (there is a lot of data on this), has a powerful influence on the formation and functioning of consciousness.

This influence stems from the main characteristics of this media: the vast amount of information that changes rapidly, the constant interruption of information reception, cognitive overload, and the rapid movement of attention.

There are already enough research data on the effects of such media on human thinking and consciousness [10]: thinking becomes superficial [8], consciousness becomes scattered; great obstacles appear on the way of transferring short-term memory into long-term memory, a mental process very important for learning; serious problems appear in reading and understanding long, continuous texts [10].

If we recall here Vygotsky's concept that the essence of mental development lies not in changes of a single function (memory, thinking, speech), but in changes of

relations between functions, then here, when we are dealing with the action of digital media, a wide field for the study of development as a process of changing relations between functions opens (even in the memory function itself the relations change: between long-term and short-term memory, autobiographical/episodic memory in a situation where an individual has so many documents are forced to change. In general, we can talk about the reprogramming of the brain under the influence of digital media.

Vygotsky said many times that a literate person is not a person who can read and write, but a different person. But a person immersed in digital media has much more reason to be a different person, especially if he is immersed in it from an early age.

A book by a professor at the University of San Diego [13] collected a lot of research data that proves that the generation born after 1997 (the so-called Generation Z), which grew up with smartphones, is characterized by big personality changes in general.

Is it possible to "read thoughts" directly from brain signals?

New methods of brain research, application of various forms of artificial intelligence (complex algorithms) in the analysis of brain signals force a new approach to the research of relations of the brain and mental functions. The very fact that the brain produces electrical potentials (signals) in various activities gives grounds for establishing a relationship (interface) with other devices, especially with the computer.

In this regard, after the advent of digital media comes an era of new areas of research, discoveries, and fantastic products of human creativity.

Here we mention some of them that have considered the possibilities of direct connections between the electrical activity of the brain and external devices: direct connections between brain and computer (in one or two directions), creation of artificial neural networks, machine learning, artificial intelligence, even direct connections between the brains of two individuals...

Many of these connections, especially those that relate to external influences on the brain, have practical therapeutic value in cases of rehabilitation of sensory and motor disorders and represent extremely important advances.

However, what is of interest to us in this case are the new phenomena that concern the higher mental functions. There are plenty of such phenomena, such as experiments, models in the form of algorithms, attempts, and popular publications. Here are just some of the questions that need to be answered: are there possibilities of direct translation of brain signals into text? Is direct reading of consciousness possible? Do researchers have the ability to decode thoughts, dreams, and intentions

by scanning the brain? Can speech communication be replaced by technology...?

Let us show a critical analysis of the above questions-hypotheses on the example of one, as it seems to us, the most successful experiment.

Employees of the University of California, San Francisco [11] conducted an interesting experiment of direct translation of brain signals into text. Four subjects (suffering from epilepsy) took part in the experiment. A large number of electrodes were connected to the brains of each of them in order to record electrical signals of the brain. The task of the subjects was to read aloud a limited number of sentences (30-50 sentences, 125 different words in total). While they were reading these sentences, brain signals (electrocortigrams) were recorded. This combination of reading and signal registration was repeated several times (the learning phase).

This was followed by a phase of careful data processing: signal amplification and processing, data translation into an artificial neural network (algorithm), in which the data (both reading and signal) was subjected to complex processing, and the transformed data was subjected to an encoding and decoding process based on the techniques used in machine translation from one language to another (with the difference that in the experiment a very limited number of sentences and words were involved).

The result was astonishing: brain signals were directly and accurately translated into text in 97% of cases, and in the rhythm of normal pronunciation! Undoubtedly, this is an outstanding achievement of applying artificial intelligence methods.

In popular publications, this result is presented as the discovery of the ability to "read minds" directly from brain signals.

Not having the competence to analyze mathematical methods for building complex algorithms used in this experiment, we believe that in this respect everything is properly done. But we will make an attempt to analyze the general meaning of the results of this experiment.

The basic tool we use here are the ideas from the final chapter "Thought and Word" in Vygotsky's book "Thinking and Speech" [3].

This text represents a synthesis of the most important achievements in the psychology of thinking and speech and speech thinking, and is still today an inexhaustible treasure trove of ideas for the study of these problems.

In the mentioned work, Vygotsky considers problems of roots, development, these functions and relations between these higher mental functions. Let us try to show how Vygotsky's ideas can also help in understanding the significance of the latest scientific discoveries made with the help of artificial intelligence discussed above.

The original thesis we defend here is formulated by Vygotsky himself: direct communication of consciousness is impossible, not only physically but also psychologically. To this we must now add: it is also impossible with the use of information devices (computers).

Our argument, which relies on Vygotsky's ideas, is theoretical, and if it proves convincing, it will be of more significance than just to understand the findings of the specific study discussed here.

Here are the relevant conclusions of these ideas.

The meaning of a word is the basic unit of verbal thought, and so it contains verbal thought and the meaningful word. The meaning of a word is not fixed, but changes and develops: historically, in ontogenesis, functionally in each concrete act of thinking (let us add that there are great differences between cultures and languages).

A serious question arises from this: can brain signals register all these nuances of meaning?

Internal speech comes from external, social speech. It is a special form of speech, and its basic functions are individual (thinking, control of its own functions, awareness). From this function comes all its characteristics, its structure: it is abbreviated (elliptical) and incomprehensible to others. Its grammar and syntax are special. It is almost always predicative, since the predicate is always known to the subject itself. Internal speech is an intermediate link between thought, which has a special syntax, and external speech, which has an extended grammatical structure; in internal speech the meanings of words change. Now we can add that in addition to words in inner speech, iconic semiotic means also have an important role, which are also pre-stratified in a concise form [5].

All these characteristics of inner speech are such that they can hardly be embodied in differentiated brain signals that can be registered by any electronic device.

The relationship of thought and word in verbal thinking is very complex. Vygotsky expresses his basic idea of this as follows: "Thought is not expressed in words, but is accomplished in words. [p. 305]. In these bilateral relations (from thought to word and from word to thought) consists all the dynamics of inner life; the grammar of thought is not identical with the grammar of speech, thought always represents something more whole than individual words, in thought and in speech, predicate words may not coincide, in thought words often "evaporate"...

Thus, the dynamics of the relation between a thought and a word excludes the possibility of expressing these relations in differentiated brain signals, which can be registered.

After these very brief theoretical considerations, let us return to the interpretation of the results of the experiment on the possibility of direct translation of brain signals into text. The first and most obvious fact is that the experiment uses external sentences with correct syntax that are spoken aloud (and there is no evidence that the subjects understand the meaning of these sentences). But most importantly, there is no internal activity in their behavior, no internal thought processes, which in this case had to be read from brain signals.

On the basis of theoretical considerations and analysis of the results of one particular experiment, it seems that there are sufficient arguments to confirm that there is no reason at all to expect the possibility of decoding complex internal thought and speech processes and verbal reasoning.

Attempting to make the connection between the early results of thinking psychology and the new research that attempts to establish an interface between the brain and digital devices raises the question of whether the results of this new research can be understood without using the crucial results of the "old" general psychology of thinking and speech.

Conclusion

For an understanding of all the phenomena discussed in this article, the work of A.R. Luria - his original works on neuropsychology and neurolinguistics (he was one of the founders of these scientific branches), his subtle studies of the components of speech activity based on clinical studies of the consequences of local brain lesions and the modern concept of the dynamic localization of higher mental functions - is of the greatest importance.

But there was no space here to analyze this great contribution of Luria.

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Scheme of Lev Vygotsky's Theory. Part 1.

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The relevance of referring to Lev Vygotsky's works and discovering the unknowable in them is a natural phenomenon that accompanies brilliant works of science, literature, art, etc. Discoveries are accidental and non-accidental at the same time, so they are either accepted immediately or pass the "corridor" of criticism. The history of the formation of Vygotsky's psychology is also the history of our way of understanding Vygotsky. The aim of the article is to reveal what Lev Vygotsky himself might not have highlighted. We have tried to penetrate into the logic, the scheme of his thinking. It is possible to carry out the reconstruction in different ways, as evidenced by the experience of the world "vygotskopovedeniya". In this article we argue the hypothesis about the logic of triangulation by L.S. Vygotsky. Triangulation acts as a method of analyzing the psyche with the help of "units of analysis of the whole". In our opinion, L. S. Vygotsky analyzed the psyche as a triangular dynamic network. The network structure allows to reveal new, logically substantiated connections between its elements. He constructed a logical "construct" allowing to confirm it empirically. The basis of the network is formed by trinities of mental functions and connections between trinities, when the same function is included in different trinities. A trinity is formed and in its development represents a synthesis of the elements forming it. Each mental function is a whole and reflects in itself a larger whole, i.e., the psyche. It is in the structure of the trinity network that this is most clearly traced. The analysis undertaken by L.S. Vygotsky undoubtedly belongs to the post-nonclassical type of scientific rationality.

Keywords: unit of analysis of the whole, triangular dynamic network, psyche, schema, triangulation, post-nonclassical type of scientific rationality.

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Схема теории Льва Выготского. Часть I

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Обращение к работам Л.С. Выготского актуально, поскольку оно сопровождается открытием в них непознанного. Открытия случайны и неслучайны одновременно, поэтому либо принимаются сразу, либо проходят «коридор» критики. История становления психологии Л.С. Выготского — это

и история нашего пути понимания Выготского. Цель статьи — раскрыть то, что Л.С. Выготский, возможно, и не выделил бы. Мы попытались проникнуть в логику его размышления. Реконструкцию можно осуществить разными способами, о чем свидетельствует опыт мирового «выготсковедения». В статье мы аргументируем гипотезу о логике построения триангуляции Л.С. Выготским. Триангуляция выступает как метод анализа психики с помощью «единиц анализа целого». По нашему мнению, Л.С. Выготский анализировал психику как триангулярную динамическую сеть, поскольку структура сети позволяет раскрывать новые, логически обоснованные связи между ее элементами. Им строился логический «конструкт», позволяющий подтверждать его эмпирически. Основу сети составляют триединства психических функций и связи между триединствами, когда одна и та же функция включена в разные триединства. Триединство формируется и в своем развитии представляет синтез образующих его элементов. Каждая психическая функция является целым и отражает в себе большее целое, т. е. психику. Из триединств именно это наиболее рельефно прослеживается в структуре сети. Анализ, осуществленный Л.С. Выготским, несомненно, относится к постнеклассическому типу научной рациональности.

Ключевые слова: единица анализа целого, триангулярная динамическая сеть, психика, схема, триангуляция, постнеклассический тип научной рациональности.

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Introduction

For more than a century psychology as a science has been in search of its foundations, which is perfectly natural for development, if it really takes place. Turning to the founders of science, revising their views, discovering what the paradigmatic framework did not allow us to see before, is an indispensable condition of development. The anthropological crisis of the early twentieth century affected all spheres of knowledge. The ontologically and methodologically complete project of L.S. Vygotsky, which synthesized natural-science and humanitarian (art, literature, philosophy) assumptions of the time, stepped far beyond them and is most relevant in our time of change.

As A.A. Puzyrej [17] denoted in his report devoted to the centennial of L.S. Vygotsky, disclosing, with the help not of Shakespeare's "Hamlet", but of Vygotsky's Hamlet, the turn to psychology, not of experience, not of personality development, but to psychology, distinguishing between "mystery" and "secret", the psychology of direct experience. Experience in our life is the experienced whole, the human state when he is aware of his state with all its nuances as a whole or "discontinuous. Integral structures of personality are responsible for the birth of such awareness and subsequent actions, as well as those that led to it. We find the most detailed concept of holistic structures in the psychology of L.S. Vygotsky. His "units of analysis of the whole" are the integral structures of personality, which are responsible for its development. We will proceed in this direction in our reasoning and will try to show what has not been the

object of psychology's close attention, but has existed "in secret" as the foundation of L.S. Vygotsky's logical scheme of constructing his theory of psychology, which reveals the "secret" of the psyche as a whole.

The need to extract the foundations of a new psychology from the works of L.S. Vygotsky is not disputed. New or developing L.S. Vygotsky's views? The words of Socrates cited by L.S. Vygotsky in "The Tragedy of Hamlet, Prince of Denmark by W. Shakespeare" characterize not only "reader criticism," but also the attitude towards the genius ideas presented in science, to which we relate the views of L.S. Vygotsky: "Socrates: "I went to the poets and asked them exactly what they wanted to say. And almost all of those present were better able to explain what these poets had done than they themselves. [10, p. 344]. It turns out that in our article we are helping Vygotsky to understand himself, how he thought, what his logic was, and thus to understand himself and our time better.

For researchers, L.S. Vygotsky's works are an enormous treasure trove, prompting discussions about the subject, method, boundaries and ontology of psychology. In the present article, we address L.S. Vygotsky's question about one psychology and his desire to develop it. What does one psychology mean to L.S. Vygotsky? Is it psychology revealing ultimate categories (hence the disputes about the subject) or psychology exhausting grounds (going beyond psychology, for example, into art)? What is ground and is the category itself a ground? Such questions and searches of answers lead away from L.S. Vygotsky's understanding. We assume that "one" can only be something that has tried to grasp the whole

and integrity (as a process) from the inside and outside (from the focus of other sciences and paradigms). Why is it that the psychology developed by L.S. Vygotsky can be "alone"? The answer is obvious: it is built on "units of the whole" possessing the property of the greater whole of which they are elements. The methodological maturity of a theory is to distinguish "units of the whole," but each theory distinguishes different units, e.g., substrate units or units that do not fully reflect the whole or are parts of it at all. L.S. Vygotsky took as units of analysis such "units of the whole" that reflect in themselves the whole, themselves being the whole; they generate and contribute to each other; they form different unities in relations among themselves and do not form a hierarchy, which differs essentially from the units of system analysis and substrate units, though he assigned the metaphor of "cell" (substrate unit) to "his units" [18]. In L.S. Vygotsky's works, we encounter "units of analysis" that are identical with the substratum unit and modality. This is what our further research is about.

The analysis of "psyche with the help of "units of analysis of the whole" in works of L.S. Vygotsky was studied by V.P. Zinchenko [13], B.G. Meshcheryakov [15], B.I. Bespalov [4], S.M. Morozov [16] and others. The aim of our article is not to reveal the method of analysis by "units of the whole", but to show the scheme of building connections between these "units".

Studying L.S. Vygotsky's works, discovering something new each time, as when repeatedly reading a multi-vector and multi-layered novel with many actors, we turned our attention to the previously overlooked trinity of "units of the whole". This allowed us to form a hypothesis of L.S. Vygotsky's application of triangular connections between "units of the whole" and the construction of a triangular dynamic network of the psyche with the help of "units of analysis of the whole".

L. S. Vygotsky is a post-nonclassic

Vygotsky's work corresponds to the post-nonclassical type of scientific rationality. This statement requires clarification. Most psychologists are of the opinion that L.S. Vygotsky applies dialectical logic to constructing his notion of the psyche. S.M. Morozov's conclusion is indicative – "The main thing that L.S. Vygotsky accepted from Marxism is the dialectical method of construction of a subject of research. The leading link in the process of such construction – allocation of unit of the analysis by abstraction of "the simple beginning", "cell and further tracing transformation of "cell" into the unit, representing "molecule" – carrier of the basic properties, inherent in a complete subject of psychological research" [16, p. 109]. Such representation is not singular. We do not fully agree with this assertion. On the one hand, in L.S. Vygotsky, the "unit" has development, on the other

hand, the "unit" initially reflects the entire psyche in its explicit and potential state, otherwise its development would have to be viewed hierarchically rather than qualitatively, which L.S. Vygotsky was against. In his psychology, the natural function is transformed; consequently, it is not preserved in that natural form, but is present in a new qualitatively different form in the mental function.

It is necessary to note a peculiarity inherent in scientists: a paradigmatic vision of the subject of research. At the time of the classical: natural-scientific paradigm in L.S. Vygotsky, attention was drawn to his solution of the psychophysical problem and his reference to the biological bases of child development was emphasized. About this E.E. Kravtsova stated simply that they saw that "everything that was done by L.S. Vygotsky and his followers does not go beyond the limits of traditional, classical science" [14, p. 61]. She also points out that "it is impossible not to agree with one of the researchers of L.S. Vygotsky's work, A.A. Puzyrej who emphasizes that L.S. Vygotsky was not engaged neither in natural mental functions, nor in higher, he investigated the process of transformation of natural functions into higher, cultural ones. In order to study this process, the psychologist should be on two positions simultaneously – he or she should consider both what the person has today, and his or her zone of the nearest development" [14, p. 63]. Under the dominance of the non-classical paradigm, L.S. Vygotsky's works were characterized by dialectics, the unity of the biological and the social, and a new way to analyze the psyche and experiment – the genetic method, in which the historical method is dissolved. The opinion that L.S. Vygotsky's views correspond to the postneoclassical paradigm is presented in the works of A.G. Asmolov [1–3], V.T. Kudryavtsev [3], B.D. Elkonin [20], S.M. Guseltseva [12], T.G. Bohan [5], T.E. Sizikova [18], etc. Each of them singles out this or that key thing in the concept that corresponds to the modern paradigm: the idea of personality, higher mental functions, the method of research "units of the whole", etc. T.G. Bohan [5] deduces self-organization in the works of L.S. Vygotsky. However, we would say that L.S. Vygotsky's works reveal free cultural self-organization. It is in the post-non-classical paradigm that the subject of research is a self-developing and self-organizing system. Unity, integrity, reflection by a system element of the properties of the whole system and the whole is not equal to the sum of its parts, but are the basic principles, respectively, and the logic of scientific research is dialectical, but not closed on the allocation of Hegelian synthesis. In the new logic, the synthesis of not two but three or more elements is possible, and the synthesis of the trinity is not at the expense of one having another, but at the expense of unity. Unity is a type of synthesis known since ancient times and preserved in the trinity studied by theology.

On the method of theory construction

The historical situation at the beginning of the last century, as at the time of the emergence of scientific knowledge in the sixteenth and seventeenth centuries, developed within two opposing determinants: materialism and idealism. L.S. Vygotsky, who was observant and educated, understood the limitations of these approaches, and in his works he devoted attention to a thorough analysis of the concepts of psychoanalysis, functionalism, structuralism, behaviorism, Gestalt psychology, personalism, reflexology, etc., step by step building the middle way for his scientific concept, looking at the concepts and connections between them considered in these scientific directions from a different angle.

Finding limitations and "discontinuities" in the logic of existing approaches of research of the psyche, L.S. Vygotsky, as he himself wrote, constructed a scheme: "... The scheme obtained by us in the course of research, of course, cannot be regarded as correctly reflecting the real process; development... It would be a great mistake to regard this schematic representation... as something more than a scheme. Quoted by A.N. Leontiev, A.R. Luria, and B.M. Teplov in the preface to L.S. Vygotsky's *Development of Higher Mental Functions* [11]. We attempt to reveal L.S. Vygotsky's scheme from the focus of postnonclassical scientific rationality. Vygotsky's interfunctional relations are based on the principle of triangulation: the whole he describes is a unity of three functions, their synthesis, which gives rise to a qualitative leap. Unity is not identity and means a common of different things. L.S. Vygotsky singles out a whole from reality, constructs it, reveals its internal connections. The whole, not equal to the sum of its parts, refers not only to the psyche, but is multidimensional and includes sociocultural, activity and communicative conditions. Earlier, analyzing "free action" [19], we encountered in L.S. Vygotsky a triple, rather than double, connection between the functions, as was traditionally established in the direction of L.S. Vygotsky's research analysis, and we approached the disclosure of the network structure of the psyche in his works. In the present article, we will reconstruct L.S. Vygotsky's scheme of construction of psychology. We would like to draw attention to the fact that the scheme and the method of research differ. Vygotsky's genetic-historical method of research is not a scheme of theory building.

Triangular relations of the "whole"

Vygotsky's psychology is a "living" dynamic system. He concentrates on relations between different functions of the psyche; he does structural, functional, genetic and historical analysis as a single analysis of development of the psyche. He cites, as established in research

works of L.S. Vygotsky, the dual relationship between mental functions, for example, between affect and intellect, perception and attention, memory and attention, perception and memory, memory and thought, etc. The conclusion about duality is not without foundation. But even now, after reading about these connections, the researcher will think of a triple connection, and the connection of each "triangle" with another "triangle."

Consider carefully the connections highlighted and we see two related triangles: "perception – attention – memory" and "affect – intellect – thought." The triangles are obvious. "Where is the connection?" – the researcher will ask. The connection is implicit, it is through thought, thought is stored in memory, and in the work of thought there is memory, thus L. S. Vygotsky points to the connection of thought and memory. But by means of what? By means of the sign, in this connection – the word. Thus, we face not two, but three "triangles": "perception – attention – memory," "affect – intellect – thought," and "memory – thought – word. All three are interconnected, and what we wanted in our reasoning to represent as a connecting link turned out to be equal and in line in the final point of reasoning. In doing so, we have presented a fragment of the network of the psyche as developed by L.S. Vygotsky. Such a network makes it possible, from whichever end one takes, to pull the entire network together and to trace, more visibly, the connection in the trinity of mental functions and, more covertly, the connection between the trinities.

Reading Vygotsky's "Lectures on Psychology," starting even from the table of contents, we can get the impression that L.S. Vygotsky takes one mental function and studies it, thus sort of dividing the psyche into its component parts. Paying tribute to the tradition, already established in psychology, of presenting each mental function independently, L.S. Vygotsky, after expressing his attitude to various approaches to the study of this function, correctly leads the researcher to connections forming in the genesis of this function. As a result, the triangular connection of perception, meaning and meaning; memory, visual thinking and perception; speech, word and perception; perception, motor and feeling; thinking, image and word; will, affect and thinking; sound, thought and meaning; and other variations of the connection, dynamic, involving the same function in different "troikas." This is what refers to triangulation, and triangulation of a special kind, not the kind presented in geodesy or by Kurt Levy in his "field." It can be confused with the one in which every two mental functions find a third. Thus, meaning, sign, word, etc. are found. At the same time, when development is included in the triangulation, it is found that the connection is dynamic and constantly reconfigured within the trinity, and, for example, word and intellect "find" the will. Consequently, depending on the focus of consideration, L.S. Vygotsky shows those or other connections

in the trinity that are equal, dynamic, and developing. These characteristic properties of connection also apply to connections between trinities, because any of the elements of a trinity in the network necessarily enters into other trinities and cannot fail to manifest in genesis its inherent connections included in its development from other trinities. The psyche, according to L.S. Vygotsky, is strict in its structure; it is difficult to describe it, and the network structure creates additional difficulties and requires the researcher to be able to "grasp the whole", which is characteristic of L.S. Vygotsky. Triangulation is a postneoclassical method that allows one to considerably broaden the cognitive perspectives of analysis, which, perhaps, L.S. Vygotsky did not bring to the final rigorous formality.

Here are a few examples given by L.S. Vygotsky, which we consider as arguments for our ideas about his triangular scheme.

1. Vygotsky develops the concept of a connection between intellect and affect, overcoming the gap between them in classical psychology. The connection has acquired a new quality – unity, which represents a dynamic triad (triangular) system. He writes: "...there is a dynamic semantic system that is a unity of affective and intellectual processes" [9, p. 22], and we remember that where a dual relationship is represented, there is necessarily a third link – meaning or sign. This new system allows us to explore both the influence of thinking on affect and the reverse influence of affect on thinking through the regulating function of meaning. "Conscious function, acquires other possibilities of action. To be aware is to a certain extent to be mastered... Things do not change from the fact that we think them, but affect and its associated functions change according to being conscious. They become in a different relation to consciousness and to a different affect, and consequently their relation to the whole and its unity changes" [6, p. 251]. L.S. Vygotsky deduces the connection of this dynamic triangulation with the will, motive, need, interests, motives, i.e., what directly directs thought, through which one's attitude toward reality is formed. Another important result of the unity "affect – meaning – intellect" is the idea. It is the idea that can be regarded as the substrate unit of this unity. L.S. Vygotsky, having undertaken at the end of his life an in-depth study of Spinoza's writings on passions, placed even greater emphasis on the regulating function of meaning and linked this unity with freedom.

2. Triangular connections form a network among themselves – a triangular network. The word formed as a result of the triangulation "sound – meaning – thought" is a unit in another series of triangular network of psychological functions and forms in its unity with thinking and speech another unit of the whole – communication. Reading L.S. Vygotsky, it is not difficult to single out such connections – they are prescribed by him with extreme precision. Here are two quotations

from his work – "Thinking and Speech: "The meaning of a word, which we have just tried to reveal from the psychological side, its generalization represents an act of thinking in the proper sense of the word. But at the same time, meaning is an integral part of the word as such; it belongs to the realm of speech as much as to the realm of thought. A word without meaning is not a word, but an empty sound. A word devoid of meaning no longer belongs to the realm of speech. Therefore, meaning can be regarded equally as a phenomenon, speech by its nature, and as a phenomenon belonging to the realm of thought" [9, p. 17]; "Speech as though combines in itself both the function of communication and the function of thinking, but in what relation these two functions stand to each other, what has caused the presence of both functions in speech, how their development occurs, and how both are structurally united among themselves – all this has remained and remains unexplored up to now. Meanwhile, the meaning of a word represents in the same measure the unit of these both functions of speech, as the unit of thinking" [9, p. 17]. For the same unit to be a unit of different wholes, which in turn are units of other wholes and other units, it is necessary to perceive the world as a network and to construct the object under study as a network. This is what L.S. Vygotsky did, in our opinion. The rows of triangulation are not built linearly; this is also one of the features of Vygotsky's vision and thought of the psyche. He could fit several rows of triangulation in one inference. Here is how he does it: "A word is almost always ready when a concept is ready. Therefore, there is every reason to consider the meaning of a word not only as a unity of thinking and speech, but also as a unity of generalization and communication, communication and thinking." [9, p. 19]. The meaning in these unities is the third unit that links and regulates the dynamic equilibrium of the other two units. He categorizes these systems as "sense intellectual dynamic".

3. The generation of some rows of a triangular network by other rows can be traced on the example of L.S. Vygotsky's study of memory. He singles out the process of substitution of some functions by others as a transition from one state of the triangular network to another. "The point is this: when you study mediated remembering, that is, the way a person remembers, relying on known signs or techniques, you see that the place of memory in the system of mental functions changes. What in direct remembering is taken directly by memory, is taken in mediated remembering by means of a series of mental operations which may have nothing to do with memory; there is, therefore, a sort of substitution of one mental function for another. In other words, as the level of age changes, not only and not so much the structure of the function which is designated as memory changes, but the nature of the functions by means of which memorization occurs changes, and the interfunctional relation connecting memory to other functions also changes" [7,

p. 392]. Interfunctional changes are the source in the triangular network.

4. We have distinguished triangular relations in L.S. Vygotsky's works based on L.S. Vygotsky's ability to see from different focal points and different positions and to make sense of reality, not only mental reality. His texts are dialectical and dynamic, not in the sense of chaos in the free designation of these or those phenomena, but in the sense of precise and clear designation for the solution of certain tasks. For L.S. Vygotsky everything is functional, any naming makes sense and solves the task of highlighting development to organize learning. L.S. Vygotsky was aware of this and wrote in his work on defectology: "In our studies of higher psychological functions we have always seen that meaningful and active remembering and attention are one and the same thing, only taken from different sides: that one can speak of logical attention and logical memory with the same right that one speaks of logical attention and arbitrary memory, that higher psychological functions are intellectualized and volitional functions at the same time and quite equally, that awareness and mastery go hand in hand" [6, p. 251]. Such a view directs attention to qualitative changes within the triangular series and confirms its dynamic essence.

Triangular series of "whole"

For full disclosure of the scheme of Vygotsky's theory, it is important for us to distinguish cultural functions. It is necessary to note some basic moments in his distinction of mental and psychological functions. An independent researcher of the history of L.S. Vygotsky's work wrote the following regarding the use of the terms "mental" and "psychological" higher functions in his work "Tool and Sign in Child Development: "As Peter Kyler's study shows, Vygotsky's terminology and phraseology differ markedly from the phraseology attributed to him in a number of places. For example, in many, but by no means all, cases Vygotsky's original phrase "higher psychological functions was changed to "higher mental functions in posthumous editions and reprints of his works, beginning with *Thinking and Speech (1934)*" [21, p. 589]. He points out the change associated with translation and republishing. L.S. Vygotsky himself in "History of Development of Higher Mental Functions" refers the concept of "cultural" to forms of behavior. In his work "The Problem of the Cultural Development of the Child," we meet cultural ways of thinking and cultural development of mental functions. L. S. Vygotsky writes, "We shall try to show that the cultural development of the child passes, if it is possible to trust the artificial conditions of experiment, in four basic stages or phases, successively replacing each other and arising from one another. Taken as a whole, these stages describe

a full circle of cultural development of any psychological function". [8, p. 12]. He leads us from natural functions (primitive and naive psychology) to psychological and cultural ones through mastering a tool and a sign, interiorization and subsequent application in behavior. The stage when functions are no longer natural, but not yet cultural, refers to mental functions: already human, but not yet cultural.

In the opposition held by L.S. Vygotsky between cultural and non-cultural human development, the distinction between psychological and psychic higher functions strengthens the opposition. Higher mental functions exist in humans as well as in primates, cetaceans, parrots, and other representatives of the animal world. L.S. Vygotsky [16] describes and analyzes with great care the experiments of C. B. Hler, R. Yerkes, W. Koehler and others with animals to identify natural functions, natural forms and mental functions similar to those of humans. Overcoming the behaviorist approach, L.V. Vygotsky singles out the third type of functions, which is peculiar only to the person. According to L. S. Vygotsky, the higher psychological functions are possessed by a personality and are inherent in a cultured person, who has mastered his or her behavior and become a personality. In L.S. Vygotsky's works, psychological and cultural functions are synonyms.

In studying the relationship between development and learning, L.S. Vygotsky will preserve the distinction between psychological and mental functions. It is also preserved in the triad – "natural (involuntary) action – voluntary action – free action. The same logic of distinction is derived in the triad as between oral speech and voluntary action, respectively, between written speech and free action. The transition from voluntary action to free action is a qualitative leap in the generalization of the personality's development, the construction of a system of beliefs and values, meanings and significance, i.e. mastering himself, his consciousness, thinking, behavior, affects, hence, the triad "speech – free action – meaning" is formed in a cultured person. Regarding written speech L.S. Vygotsky notes that in addition to freedom and arbitrariness, it requires awareness. In L.S. Vygotsky's study of speech, the triad "arbitrariness – logicity – consciousness", which passes through all triads of the three states of development of mental functions, is most clearly traced. Such triads should be carefully considered, which requires a separate study.

The distinction introduced by L.S. Vygotsky concerning natural: mental and psychological functions, leads us to the idea of three rows of triangular network: the first row of triangulars – natural functions, the second – mental, the third – psychological (cultural) mastering of a person's behavior. But! L.S. Vygotsky denotes that this is not a hierarchy of functions and that each state is not independent, it is not preserved in development, but is objectified in each subsequent state. It may

be difficult to imagine, but the triangular network does not actually have three rows. It has one row by virtue of its genesis and dynamism, constantly changing and appearing now as natural, now as natural (mental), now as mental (cultural), now as psychological (cultural). Within the series — heterochronicity — changes in the trinities follow a chain reaction as the changes occur, caused by age, learning and self-organization (mastering oneself).

Discussion of the results of our reasoning

Today in the humanities the method of triangulation is used in social psychology and sociology. N. Dentsin [22] distinguishes four main types of triangulation in humanities research: data triangulation, research triangulation, theoretical triangulation, methodological triangulation. He believes that all types of triangulation allow for reliable, in-depth, reliable and large-scale results, giving a detailed, voluminous and balanced view of the research subject. Intuitively, without focusing attention, L.S. Vygotsky uses this method and understands its qualitative difference from other methods. He writes, "It has always been assumed that all mental functions act jointly, that they are bound together; however, the nature of connections, how functions are interconnected and what changes in them depending on this connection have never been studied. [9, p. 414].

Hegelian, who was the founder of psychology, W. Wundt applies the triadic relationship in the construction of the psychological system, but reduces the driving forces of development to the dual mechanism of association and apperception, as did the founder of psychoanalysis, Z. Freud, who revealed the triadic structure of consciousness, reduces development to the mechanisms of "libido" and "thanatos. The triadic relations themselves were viewed statically. Vygotsky's recognition of the triadic relations in the psyche, its time and space, and personality allowed him to create a viable dynamic concept. Triadicity acquired its dynamic properties, and we will use the modern term "triangulation" to distinguish it, implying a dynamic triad.

Let us note the positive influence of the network structure of the Internet, thanks to which we are now mostly ready to understand L.S. Vygotsky. The means

used influence the development of thinking and the formation of ideas about the world; in turn, thinking and imagination influence the means. The trinity "means — thinking — imagination" in relation to reality allowed us to see it differently, from a network perspective, the way L.S. Vygotsky saw it, we assume. In order to understand network reality, it is necessary to be meaningful and to apply the born meaning in the use of the medium. This is the task of learning in our new reality.

In developing practical psychology, L.S. Vygotsky "highlights" such integrities, by studying which it would be possible to influence learning, education, productive activities that benefit development. Triangular connection was built in such a way that it was possible to isolate the mutual influence of wholes to solve problems of organization and self-organization, change in a certain direction. This direction for L.S. Vygotsky was the "cultural man", a person with developed higher (cultural) psychological functions — a personality.

Conclusion

Understanding of Vygotsky's scheme of psychology of mental functions in the sense of functions of the psyche allows not only to investigate his works from a different angle, but also, the most important, to apply in practical activity the knowledge that whichever end you pull and influence, changes will affect the entire network of the psyche. These changes can be traced not through the chain, but through the network, when changes are manifested in the trinity, which places new demands on the conduct of diagnostic research, in which there is no place for disjointed testing or observation of individual mental functions. Development of new methods covering, firstly, the trinity of mental functions, secondly, consequences, tracing changes in a network, thirdly, development of methods aimed at development of such functions which are results of synthesis in the trinity of functions, for example, free action as result of synthesis in the trinity of awareness, logicity and arbitrariness. Such functions are the results of synthesis, i.e., generated by the trinity is a separate topic in our research. In the present paper we have presented arguments in favor of confirming the hypothesis of Vygotsky's triangular scheme of the psyche.

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L.S. Vygotsky's idea of mediation: semiotic and educational projections

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The work is aimed at discussing and clarifying the understanding of L.S. Vygotsky's idea of mediation in relation to educational processes and the semiotic perspective of their research. The provisions interpreting the concept of “sign” as a mediating mechanism of cultural and historical development of a person, the growing up of a child, the development of his mental processes, language thinking are presented. The history of the formation of semiotic concepts, their isomorphism to the ideas of L.S. Vygotsky is considered: the development of a sign, including verbal, allows you to move from natural actions into a conditional, virtual space, with a wide repertoire of not only mimesis, but also symbolic actions. The idea of the mediating mechanism of speech reflection as the basis of functional literacy is being developed. Speech reflection and diary activity are considered as the realization of the idea of mediation in language teaching. The semiotic interpretation of L.S. Vygotsky's mediation theory is presented, educational projections of its implementation in teaching the native language are shown. From the point of view of epistemological searches, a comparison of the ideas of Vygotsky and Levi-Strauss is undertaken. L.S. Understanding model Vygotsky, which underlies modern ideas about meaning and speech affirmation, is indicated by the metaphor of translation: it is the translation of alienated external meanings into the mental language of internal speech and the transformation of meaning into meaning, and then – the “internalization” of meaning, that is, the translation of the meanings that have arisen into external speech and the formation of a new, enriched meaning. It is shown that L.S. Vygotsky's semiotic merit also consists in the fact that the scientist understood the linguistic sign as an intermediary sign and brought it into the space of culture, thereby opening the cultural and historical horizon of interpretation of semiotic phenomena.

Keywords: sign, semiotics, theory of mediation, diary of speech observation, functional literacy, school of understanding.

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Идея опосредствования Л.С. Выготского: семиотические и образовательные проекции

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Работа направлена на обсуждение и прояснение понимания идеи опосредствования Л.С. Выготского применительно к образовательным процессам и семиотическому ракурсу их исследования. Представлены положения, осмысляющие понятие «знак» как опосредствующий механизм культурно-исторического развития человека, взросления ребенка, развития его психических процессов, языкового мышления. Рассмотрена история становления семиотических концепций, их изоморфность идеям Л.С. Выготского: освоение знака, в том числе словесного, позволяет перейти от натуральных действий в условное, виртуальное пространство, с широким репертуаром не только мимесиса, но и символических действий. Развивается представление об опосредующем механизме речевой рефлексии как основе функциональной грамотности. Речевая рефлексия и дневниковая деятельность рассмотрены как реализация идеи опосредствования в обучении языку. Представлена семиотическая интерпретация теории опосредствования Л.С. Выготского, показаны образовательные проекции ее реализации при обучении родному языку. С точки зрения эпистемологических поисков предпринято сопоставление идей Выготского и Леви-Стросса. Модель понимания Л.С. Выготского, лежащая в основании современных представлений о смысло- и речепорядении, обозначена метафорой перевода: это перевод отчужденных внешних значений на ментальный язык внутренней речи и превращение значения в смысл, а затем «овнешнение» смысла, т. е. перевод возникших смыслов во внешнюю речь и образование нового, обогащенного значения. Показано, что семиотическая заслуга Л.С. Выготского состоит и в том, что ученый понял лингвистический знак как знак-посредник и вывел его в пространство культуры, тем самым открыв культурно-исторический горизонт интерпретации семиотических феноменов.

Ключевые слова: знак, семиотика, теория опосредствования, дневник речевого наблюдения, функциональная грамотность, Школа понимания.

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Introduction

L.S. Vygotsky's cultural-historical approach in its entirety contains an essential instrumental part — the concept of mediation. It reveals the whole whole of the approach. To see this, it is necessary to address the problem of the sign as a semiotic phenomenon. It is noteworthy that in one of his reports V.V. Ivanov spoke about L.S. Vygotsky as the predecessor of the Moscow-Tartu semiotics. The idea put into the wording of the topic of the report might seem to be some exaggeration. But it turned out that this is exactly a statement of fact.

Sign mediation is the basic category of L.S. Vygotsky's cultural—historical theory [5], meaning a way to control behavior using a sign or a sign complex. A radical change in the very structure of activity due to the inclusion of a sign in it leads to the transformation of natural, direct processes into cultural, mediated ones.

The speech maturation of a child goes this way: the initial identity of himself and his speech, the syncretism of speech and other types of behavioral actions, their non-reflexivity must be transformed. Through awareness, arbitrariness, intention, a "person—language" relationship should develop. Speech reflection and its tools

should act as intermediaries in the development of human language. Finding an activity-based tool for mediating these relationships is one of the unsolved tasks of language education.

The purpose of the article is to present a semiotic interpretation of the idea of L.S. Vygotsky's teaching and to show educational projections of its implementation in teaching the native language.

Semiotic projections of the mediation concept

As is known, initially, in ontogenetic development, the sign (as an artificial tool) acts as an intermediary in the relationship between a child and an adult. In this process, the sign acquires additional meanings corresponding to certain social and cultural norms and pragmatic contexts. When L.S. Vygotsky proposed this idea in the late 20s and when he introduced the concept of a sign into his concept, he was obviously familiar with the works of F. Saussure [14], but could not yet know the work of Ch. The Pier, published in the second half of the 30s and later translated into Russian (see the section "The Doctrine of signs" in the book [12, pp. 176-223]).

We emphasize that L.S. Vygotsky introduces the concept of a sign as an instrument that becomes a means of transforming the psyche from natural, biological, into "cultural" and "historical". Thus, L.S. Vygotsky found a universal meta-tool, with the help of which it was possible to get out of the field of psychological proper into the space of culture and communication.

The question arises, why exactly does the sign have the ability to synthesize the natural and cultural and be a source of generating new meanings? The structure and essence of the sign is the replacement of one by another, it is the reference of one to another, the establishment of their relations. Due to the referential property of the sign and its ostranizing ability, sign complexes participate in the complex process of producing new meanings. The world of signs turned out to be the universal tool with which higher mental functions and human behavior proper were formed.

F. Saussure, one of the founders of semiotics, had in mind only the conventional type of sign. This is a sign-symbol, according to the typology of Charles Peirce. Later, Peirce identifies three types of signs: the iconic sign, in which the signifier and the signified are similar to each other, the index sign, in which this similarity could be indirect, not obvious, but still took place and could be objectively reconstructed. And finally, a symbolic sign that does not imply any similarity between the signifier and the signified. The semantics of this sign is exclusively conventional, contractual. An example of a sign-symbol is a traffic light: a community of citizens can always agree on a change in the semantics of colors, which is highly conditional.

According to Peirce, cognition is a process of mediating reality by signs. The need for mediation arises because cognitive activity is carried out not by an isolated subject, but by a community that develops a general idea of the world. Cognitive processes are always the production of signs and their use in communication. In this sense, truth, according to Peirce, is not the correspondence of judgments to some objective state of affairs. It represents a consensus reached within the community. In other words, truth is not a semantic, but a conventional result. The sign becomes a means of constructing an imaginary space for the execution of volitional decisions and access to the socio-cultural space of communication, including autocommunication.

So, if the iconic sign and the index sign have a different degree of identity as a common ground, then the symbolic sign has a different quality: for example, higher animals can be taught to distinguish between iconic and even index signs, but not symbolic ones, for which the connection of the signified and the signifier is always conventional. The typology of Peirce's signs has not only theoretical, but also quite pragmatic significance. Michel Foucault convincingly showed (see [16; 17]) that in the era of the European Middle Ages, an iconic sign dominated the culture, which determined the visual appearance of cities, up to street advertising. And in Modern times, the sign-index dominated, which resulted in the appearance of paper money, as well as the rapid growth of the insurance business. This is understandable: the deep strategy of the index sign was a metonymic strategy, which, in our opinion, is productive for generating mythologies, stable stereotypes and ideologies. This is confirmed by the reflections of M.M. Bakhtin: "Everything ideological has a meaning: it represents, depicts, replaces something outside of it, i.e. it is a sign. Where there is no sign, there is no ideology. The physical body, so to speak, is equal to itself – it means nothing, completely coinciding with its natural single reality. There is no need to talk about ideology here" [4, p. 13].

R. Jakobson substantially supplemented and developed the division of signs into types [18], proposed by Ch. By the pier. If the signs at the Pier – icons, indexes and symbols – stand separately from each other, then Jakobson believed that all signs have common features, the difference lies in the predominance of one characteristic over the others.

Mastering the sign, including the word, allows you to move from natural actions into a conditional, virtual space, with a wide repertoire of not only mimesis, but also symbolic actions. It is important that in his semiotic studies L.S. Vygotsky [5] never went into the field of naive ontology, which sometimes even structuralists who demonize the concept of "structure" sinned. Thus, Vygotsky retained a scientific epistemology that rigidly separates the content (object) and the metalanguage of description.

In this regard, it is possible to compare Vygotsky and Levi-Strauss, despite the difference in their scientific fields and research strategies. Compare them in terms of their epistemological searches. What is the instructiveness of the epistemological experience of the French ethnologist?

K. Levi-Strauss is the title figure for a galaxy of French semiotics and structuralists. His main research interest is the study of myths of South American Indian tribes. As a result of numerous expeditions, he published (1947) the book "Sad Tropics", which presents a lively story about the trips and myths of the Indians. 10 years later, in the situation of the structuralist boom that has begun, "Structural Anthropology" is published, which immediately became a scientific bestseller. At the same time K. Levi-Strauss was not entirely satisfied with the chosen metalanguage: binary oppositions destroyed the living body of the myth, although they gave a coherent picture of its structure. The scientist began to look for a metalanguage that would be in relation to the object of description in the relationship of "participial non-occurrence" (the well-known Bakhtin formula). And such a metalanguage was found: it was the language of musical poetics, primarily the sonata form. The concepts of "main theme", "counterpoint", "variations" and others turned out to be relevant to the mythopoetic language [13, p. 13–15]. But this was already the paradigm of post-nonclassical science. The nature of such objects as mythology, music, poetry (due to its complexity) does not imply the rigidity of binary-oppositional analysis, which inevitably entails some kind of rational violence of the researcher. The explanatory strategies of classical rationality in this case may give way to non-classical, understanding strategies for translating the language of myth into a musical or poetic language, and the choice of the translation language is probably related to the paradigmatic completeness and syntagmatic diversity of such a language.

It seems that L.S. Vygotsky, who drew attention to semiotics emerging in his time, visionarily understood the potential of the sign, and managed to transform this category into an instrument of cultural and historical measurement. The idea of mediation is the most important here. In M. M. Bakhtin's later recordings there is a lapidary and meaning-intensive definition of an artistic utterance. He defined it as "indirect speaking." What is "indirect speaking"? According to Bakhtin, the author is doomed to silence. Those who are authorized by the author speak: narrator, narrator, lyrical hero, chronicler, etc. [3] An expressive example is Pushkin's Ivan Petrovich Belkin, whose manuscript was allegedly found by the author and publisher of Belkin's Stories. Such intermediaries in modern narratology are called "narrative instances". They embody the idea of mediation. We cannot yet reconstruct the genesis of the concept of mediation for Vygotsky: there is a Hegelian version, there are others. But the coincidence of this category for psychology and aesthetics, and in fact for the whole understand-

ing of the interaction of consciousness with the outside world, becomes an ontological fact.

In the works of scientists, participants of the Moscow-Tartu Semiotic school (V.V. Ivanov, Yu.M. Lotman, etc.), it was shown that among the various mechanisms of meaning generation, tropes, generally symbolic means, change of reader codes, change of receptive attitudes occupy an important place. An important meaning-forming mechanism of culture is associated with the "palimpsest effect", when meaning generation occurs as if by accident. The production of new meanings due to the layering of different text layers and the interaction of these layers generates new super-meanings. "And since I didn't have enough paper, I'm writing on your draft, And someone else's word comes out..." (A.A. Akhmatova). The poet Vyacheslav Ivanov: "Here is a long minea of life, a palimpsest of memories." Memories are arranged as a complex palimpsest mechanism, also with the generation of new, unpredictable, unplanned meanings.

It is necessary to correlate what has been said with educational and, in general, with the anthropological problems of today. According to A.G. Asmolov, the code of unpredictability in human behavior can be considered an anthropological code [1]. The capacity and accuracy of this definition, in our opinion, consists in the fact that unpredictability is one of the highest manifestations of the human in man.

The uncertainty of the present and the code of unpredictability of human behavior are certainly related: uncertainty is a condition for the unpredictability of progressive choice. But for all the drama of this collision, it is a resource of preadaptive strategies, including non-trivial statements and actions, that is, such discursive and behavioral actions that create precedent events that open up new spaces, logics, and even possible worlds.

The inefficiency (unpredictability) of the syntagmatic generation of poetic speech – the highest manifestation of human discourse, according to V. Vs. Ivanov, distinguishes genius poetry from trivial. At the same time, the qualification "genius poetry" is not a subjective (taste) characteristic, but means in the language of information theory not only the maximum possible semantic saturation of the utterance, but also the interactive work of the poetic text to mobilize readers' cognitive resources (memory, background knowledge and contexts, subjective experience, "understanding" strategies). The result of such "poetic communication" is the generation of new meanings, which the potential reader "carves" in an understanding effort from the poetic text, formalizing these meanings in the author's version, interpretation, theory [7].

Educational projections

Speech reflection and diary activity as the realization of the idea of mediation in language teaching. The poetic

text shows the essence of the structure of the language as a whole. The functioning of the word, the implementation of speech behavior has the same mechanisms of mediation — symbolic. The question arises about the method and forms of their extension for a native speaker, about educational projections of the idea of mediation in language teaching.

L.S. Vygotsky outlined the question of the unconsciousness of speech processes (in relation to the content of teaching the native language). We often have speech skills, but we don't know that we have them. These operations are often not realized by us, we own them spontaneously, situationally, automatically. This is the limitation of our behavior: if I have some skill and do not know that I own it, I use it automatically. [6].

In the activity pledge, not the sign itself, but the reflection of a person, aimed at awareness, understanding of the sign, becomes the mediating link of the relationship "I am the world", "I am the language". The development of speech reflection "is the emergence, expansion, qualitative change, internal structural restructuring of the indicative link of initially spontaneous speech activity." [9] Speech reflection can be defined through the metaphor of a mirror, peering into which we try to consider our speech experience, its features, details, and see our speech portrait. How to organize this speech mirror intermediary for the student?

Let's denote an effective means of developing speech reflection, which we found in the educational plan for the language development of schoolchildren and students. This is a special educational genre of a speech observation diary. Working with a diary involves observing the surrounding speech (everything I hear, read, write, say) and realizing my speech characteristics, difficulties, mistakes, preferences, speech tasks, values, as well as answering the question why I say so (which means that I say so) — and myself the formulation of such a question. This work is very important for correcting speech behavior and understanding their tasks in the field of speech culture. "I am in the mirror of my own speech" — this is what a diary of speech observations is as a tool for the development of speech reflection.

In order for the mediation mechanism to work, it is important to keep in mind two characteristics of speech reflection that determine diary work: subjectivity and eventfulness. Reflection is not generalized conclusions about the laws of language, but the ability to work with your own, unique, subjective experience. This moment is connected with the formation of students' needs and with the actual needs of children. For example, in the diary there is a traditional heading "Amazing word". Students write down "amazing words", but the reasons for surprise here will be extremely subjective. Another example: students are invited to lead their own creative column, but exactly the one that everyone is interested in leading — and this choice is also extremely subjective.

To arouse this kind of individual interest, to create conditions for the emergence and steady presence of a motivational background of this type is one of the successes of working with a diary and speech reflection in general.

The eventfulness in this case is connected with such a fact of speech, the meeting with which became a bright spot, an amazing moment that made you think about something, realize something, discover for yourself in the language or in the idea of the person speaking, about yourself. It became an event that remained in my memory, changed me. The speech event made me look at my speech differently, at the problems of communication, at the word and the laws of language in general, made me wonder, look for an answer to it. It is these speech facts that should first of all get into the diary and be supported by the teacher as valuable, developing.

In the School of Understanding [11], the Russian language course is based on a reflexive basis, in an activity-based manner and with the aim of developing components of the culture of linguistic, communicative thinking. The better a student observes a live speech, a word, the better his functional literacy, critical attitude to speech, and research skills are formed [10]. At the same time, the event-developing environment, which includes work with the diary of speech observation, assumes

- creating conditions for actualizing the understanding of the word as an act — based on understanding the laws of speech communication, solving rhetorical tasks, analyzing situations of language conflict, mastering speech strategies of dialog communication;
- mastering the methods of speech reflection, self-control;
- development of information culture based on knowledge of dictionaries and the ability to use them in a situation of natural difficulty in creating statements and text;
- instilling research skills while observing the word;
- formation of the main components of functional literacy.

With this approach, the analysis of one's own speech difficulties, the formulation of individual tasks for self-development in the field of speech culture are carried out on the basis of working with one's own speech experience. This leads to a new quality of speech communication.

The loss of live observation of the word as the most important link in teaching the native language remains one of the most significant omissions of modern methodology, which has a negative impact on the entire course and on the results of language education. These results are characterized primarily by functional illiteracy and a low level of motivation for literate speech.

Instead of a spiral ascent from what we "know how to do, but do not realize that we can", to increasing arbitrariness, intention and awareness, we go by not recognizing our skills and learning "from scratch". Someone

has already observed everything for the student and gave him a selection of words in a ready-made form in exercises, textbook material, teacher's handout. The technology of working with the speech observation diary systematically fills this niche. The diary is kept by schoolchildren of all levels and students.

The mediating mechanism of the development of speech reflection as the basis of functional literacy. In written and oral speech, communication participants strive for understanding and mutual understanding. Transcoding of information should not interfere with the ability to understand the speech design. The need to write something so that you are understood is actualized in the modern socio-cultural situation (already children of primary school age, I use various electronic devices, post information messages in personal correspondence, in general chats, in social networks, run their own blogs, etc.). This is a resource for motivating competent writing and forming the motive "I write competently so that I am understood." The ratio of understanding/mutual understanding and literacy of speech is one of the aspects of teaching the native language that are not developed in an active way. This aspect is included in the model of functional literacy development, the criteria of which are described in [10].

One of such criteria is the development of speech reflection. In diary work, this is the ability to observe, stop, fix and analyze students' own speech and the speech of people around them in various communicative situations. Most often, in educational technologies, a teacher organizes work with an educational text at a lesson or training session, when the student's personal speech experience is not involved and is not discussed. The language is studied object-wise, the purpose of learning the native language becomes abstract, related to everyone, but not to the individual experience of the participants in the training. The student masters the study of norms, rules of oral and written speech at the level of meanings, but not personal meanings.

A high level of development of speech reflection is an important condition for the development of functional literacy. The better the child observes the word, the higher the level of his functional literacy. At the same time, diary activity implements the idea of mediation in several aspects. An event-based educational environment helps students analyze their speech experience and form the value of their attention to the word. The organization of joint reflection is associated with transitions from a general meaning to a personal meaning and again to a new, generalized meaning, enriched by the child's own understanding. At the same time, the student's personal speech experience and understanding effort are actualized to such an extent that they lead to the formulation of the principle "effort is more important than result" — the principle underlying the organization of the processes of discovering new personal opportunities [8].

In this context, the speech observation diary functions as a technology that prevents gaps between natural

and educational speech. The diary of speech observation allows students to form a lively motive for learning "to be literate in order to be understood", and language learning in this case opens the framework of learning, drawing into it important life situations and values for students. There is a lively reaction of the child to someone else's and his own word, the emotional and intellectual involvement of the student in the personal living of the educational situation.

Within the framework of the School of Understanding educational system, focused on the transition from knowledge to understanding, the experience of working with a diary of speech observations is summarized. This technology is determined by the goals and objectives at each stage. So, the goal of the first, initial stage is to motivate children to observe their speech experience. The discoveries made through observation make the child look closely at the surrounding speech. Motivational mechanisms of observation are developed here thanks to a collective search, which includes significant adults (friends, family). The second stage is associated with the creation of a collective diary of speech observation, common to a class or a group. There is a need to formalize the observation with the help of symbolic and symbolic means so that it is understandable to another. For example, the reflection of one's reading experience that is relevant for first graders (awareness of gaps in speaking and writing) brings gaps in visual and auditory images of the word into the subject of discussion and allows us to raise questions: why do we not write the way we speak; why are there rules of writing that differ from the rules of oral speech, etc. The third stage is the student's personal diary. At this stage, involvement in the diary activity of different aspects of the child's life makes the observation process synthetic, lively, meaningful and emotionally attractive, individually and socially significant. One of the tasks here is the emergence and support of child—adult interaction that is scarce for today's socio-cultural situation. Overcoming intergenerational gaps and the development of convergence of consciousness of all participants in interaction occurs here through the creation of family diary headings (these are some precedents-impulses that have the effect of a chain reaction and include family collectives in the developing educational environment). Thus, the diary forms both the "I —language" relationship and the "I—world" relationship, acting as a mediating way of realizing these relationships and correcting them, managing them.

Conclusions and conclusion

Typologically, the non-redundancy, unpredictability of the poetic text brings it closer to the uncertainty of the present time, the rapid change of speech and other processes and phenomena. This makes it possible to directly or indirectly use the inventions of poetic language as a

resource for preadaptive discursive and translational actions. Thus, the poetry of futurists (Velimir Khlebnikov, Vasily Kamensky, etc.), the experience of poetic zaumi "Chinaries" and "Oberiutov" opened new directions not only in the development of world poetry and theater, but also expanded the mental horizon of "new worlds". The convergence of distant things in culture can become a resource for understanding the uncertainty of the present.

The choice of L.S. Vygotsky's model of understanding is not accidental: even today this model is the basis of modern ideas about meaning and speech affirmation [2]. The compressed expression of this model can be designated by a metaphor of translation: it is the translation of alienated external meanings into the mental language of internal speech (always purely predicative and agglutinative) and the transformation of meaning into meaning, and then — the "internalization" of meaning, that is, the translation of the meanings that have arisen into external speech and the formation of a new, enriched meaning. The pragmatics of the L.S. model Vygotsky consists not only in its explanatory power of the most intimate processes of human consciousness and not only in the fact that it allows, thanks to the new developments of Vygotsky's students and followers, to accurately diagnose possible speech pathologies.

The meaning of the model, its refinement and development is a resource for understanding complex cultural phenomena, some of which seem to copy individual features of human consciousness. Poetic and prosaic absurdism (Gogol's "Notes of a Madman" or Vvedensky's poetry, the paradoxes of "two Alises" by L. Approaching human psychopathologies, they give productive projections associated with linguistic, socio-cultural explications: lexical neologisms, intentional agrammatism of written speech, paradoxes that contradict common sense and ordinary logic — all this constructs new cultural worlds.

Vygotsky's mediation model and its semiotic modification clearly influenced R. Jakobson's formation of the concept of generative mechanism — "the axis of selection and the axis of combinations" [18]. This generative scheme was used by us when creating a computer educational product "Historical Cubes", in which history is presented as a text, an "alphabet": the paradigmatic axis of selection was made up of ten historical concepts, and the syntagma of the axis of combinations was formed by a combination of this "alphabet" according to the text of the "Initial Russian Chronicle". The semiotic basis of the game was the opposition "paradigm / syntagma": each cube represents a paradigmatic set of various iconic signs of the concept of this cube, from which the student can choose only one image in accordance with the narrative of the "Tale of Bygone Years". Then the user places the selected image on a horizontal ribbon (syntagma), thereby repeating the mental model of speech generation.

As historical material in the game are used: The Initial Russian chronicle, the epics of the Kiev cycle, fragments

of the "Words about Igor's regiment". The educational game "Historical Cubes" gives the student an opportunity not only to get acquainted with the most ancient period of national history and the masterpieces of written and oral culture of Kievan Rus, but also to learn how to highlight key episodes in a narrative source, master the "translation" of verbal information into iconic and vice versa. As a result, an idea is formed about the complexity and inconsistency of the historical process and its reflection in historical texts; skills are developed to use generalized (theoretical) concepts as a tool of cognitive activity. The approach to this kind of historical technology is reflected in the work [15].

In educational and linguistic terms, the idea of L.S. Vygotsky's mediation is not realized with an object approach to the study of the word and is fully realized with the communicative-activity study of the language through the development of speech reflection and live observation of the sign in communication situations. From this point of view, diary work with the word ensures the development of speech reflection and mastering the actions of speech behavior on the basis of overcoming the syncretism of the "I—language" relationship and bringing (thanks to the intermediary diary) the speaker into a meta-speech position. In language education, an important link has been missed: working with your own and someone else's speech, included in a live situation, which you need to be able to observe, stop, fix, detect speech laws and your own meanings. Without this, functional literacy is unattainable.

Why is it difficult to wrap on your speech behavior what is being studied in native language courses? Because the students are not offered an appropriate mechanism. As a result, there is a gap between everyday (natural) speech behavior and its artificial modification in an educational situation. The diary also mediates these relationships, since it is charged not only with the subject potential, but also with the meta-subject. Since it acts as a means to control the dynamics of the development of individual speech culture and form individual relationships with the word, it is directly related to the personal development of a person. By blurring the subject boundaries, the diary brings its author into the "man— world" relationship, mediating them with a word. The results of working with the diary can be extrapolated into integrative areas of activity related to the analysis and use of symbolic means, the expression of personal meanings.

The semiotic merit of L.S. Vygotsky also consists in the fact that the scientist understood the linguistic sign as an intermediary sign and brought it into the space of culture, which opened the cultural and historical horizon to psychology. The productive longevity of Vygotsky's cultural and historical school and its relevance are due to the interdisciplinary synthesis of the ideas of its founder and the systematic developments of his students and followers.

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DISCUSSIONS AND DISCOURSES
ДИСКУССИЯ И ДИСКУРСЫ

Cultural-Historical Psychology of Mastering Activity and Alternatives to Digitalization

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The article analyzes approaches to education where digitalization does not hinder the development of thinking, understanding, and acting among the teenagers. The article is based on the premise backed by the cultural historical theory of Lev Vygotsky and the concept of mastering ways of thinking by Vasiliy Davydov that existing ways of digitalization decrease the developmental opportunities of teenagers. In the case of common-sense digitalization communication processes between teenagers, teachers and different adults are reduced to scripts of interaction with monitors or digital devices according to behavioristic scheme “stimulus- reaction”. These stereotypic interactive processes do not motivate teenagers to increase their level of situational awareness and understanding of others in social interactions. The operational uniformity, supported by algorithms, without stimulating the discovery of new elements and units in the actions of the students, and the excessive chaotic visibility, diverting their attention to eye-catching but not essential elements for a better insight into the learning problem in typical digital systems, reduce the ability of teenagers to master skills such as modelling and idealization. The author considers a different type of digitalization in education that gives an opportunity to master the ways of design activity, research activity and meta-game activity. In this instance proposed visual items and operational units in digitalized simulative milieu are analyzed and considered by teenagers in communication with teachers and peers as sense bearing symbols and schemes representing personal understanding of situation by different participants of a teamwork. The author proposes that conceptual instruments of the activity theory can be used as the new framework to design and to elaborate educational digital systems of next generation that stimulate development of intellectual abilities.

Keywords: activity approach, the way of action, thought act, joint activity, thought activity, cultural-historical theory digital-algorithmic approach in education, digital-cognitive approach in education processes.

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Культурно-историческая психология овладения деятельностью и альтернативы цифровизации

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В статье рассматриваются условия, при которых процессы цифровизации перестают быть фактором, ограничивающим развитие способностей мышления, понимания и действия человека. С точ-

ки зрения автора, в соответствии с культурно-исторической теорией Л.С.Выготского и концепцией освоения способов мышления В.В.Давыдова, существующие походы к цифровизации снижают возможности развития подростков. Процессы коммуникации подростка с педагогом, экспертами, сверстниками редуцируются к сценариям взаимодействия с монитором и цифровым устройством по принципу «стимул—реакция». Они не требуют усилий по повышению уровня понимания ситуации действия и позиции другого человека. Однотипная (monotone repetitive) операциональность (operational sameness) и избыточная наглядность (illustratory redundancy) цифровых систем не позволяют подросткам осваивать способы моделирования и идеализации при решении учебных задач. Вместе с тем автор утверждает, что возможен другой тип цифровизации процессов образования, обеспечивающий овладение подростками способами проектной, исследовательской и метаигровой деятельности. В этом случае вводимые визуальные изображения и процедуры оперирования с ними рассматриваются в коммуникации с педагогом и другими подростками как смысловые знаки понимания ситуации разными участниками. Концептуальные средства теории деятельности являются основой проектирования и разработки цифровых систем следующего поколения, экстернизирующих работу сознания и способствующих развитию интеллектуальных способностей.

Ключевые слова: деятельностный подход, способ действия, мыслительный акт, совместная деятельность, мыследеятельность, культурно-историческая теория, цифро-алгоритмический подход в образовании, цифро-когнитивный подход в образовании.

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Introduction

The main task of this article is to outline the role of the activity approach and cultural-historical theory in elaborating and designing new types of digital environment and identify how these theoretical toolkits can be applied to increase the level of consciousness in education realm and ensure conditions for the students to master the new ways of acting in a specific situation. The article outlines the principles of a digital environment that is impossible to design and implement without instruments and concepts of activity theory. At the same time, it contains some insights and defines newly identified problems for the cultural-historical theory and Vygotsky' tradition in regards to design and organization of the new type of digital environments that need to be solved to answer the question of how the students master the new ways of action tracing the genesis of knowledge.

To achieve the stated goals, the false and outdated ontic scheme “organism- environment” borrowed from the 20th century biology should be problematized. The ubiquitous trace of this ontic scheme can be encountered everywhere: for example, in a metaphoric description of digital platforms as “ecosystems”. This imitation of the natural processes of the universe in ICT language is a crooked way to naturalism. But the human being is not a mechanical entity aggregating interconnections between stimuli from the environment and reaction to them. A human being does not just live in the natural environment. He/she lives in the cultural and historical processes of activity, organizing mutual activity with other participants in teams, gaining understanding, acting in VUCA (volatile, uncertain, complex, ambiguous) situations, elaborating models to stimulate cognition and to organize thinking. The full-fledged form of human activity is thought-activity systems [18]. The problematization of

the ontic schemes “organism – environment”, “human being – environment” leads to differentiation of some of the very important concepts of cultural-historical theory – the mediation (oposredovanie) and the instrumentalization (oposredstvovanie). While the first term stands for application of signs, symbols, schemes, meaning and references to increase understanding, the “instrumentalization” is usually seen as a means to organize actions.

The limitations of today's digital environments – video games, TIK-Tok and metaverse chats, Internet browsing, various gadget games – can be clearly seen if they are formulated using the activity approach, which means that the outcomes of the development of intellectual abilities (thinking, understanding, acting, reflecting and others) are defined by the student's mastery of activity tools and instruments (schemes, concepts, ways of doing, etc.). All those environments share the same characteristics: the operational uniformity, the illustrative superfluousness with an abundance of visual stimuli, and the downgrading of action patterns to previous reactions that cancel the randomness or contingency of human interactions in situations..

Furthermore, according to Yuk Hui [26], the very emergence of a digital object changes the framework of thinking and the organisation of consciousness as a result of algorithmisation, because at the individual level the performance of logical operations realised by the autonomous functioning of the machine begins to be imitated as the key element of consciousness and thinking.

Systems of AI are beginning to dominate over the intentions of human beings to plan and to realize new action by help of reductions of the new situation to previous reactions within known stimuli and former action paths. AI systems provide a set of options in actual situation on the basis of previous reactions of consumer in prior situation. Thus, digital systems determine what a

human being is willing to choose and do. This brings us a fundamental choice: either a human indulges in mechanistic “behaviorisation” within the digital “stimulus-reaction” scheme and robotization of his/her action or, on the opposite, he/she masters the digital platform using it to achieve specific goals and tasks.

New approaches to digitalization of education, elaboration of the new instruments to master research activity and design and project activity on the basis of thought-activity concepts are developed today in the Russian “Kruzhok Association” (Association of technological clubs) where the students are creating new devices and digital models to control digital environments in teams together with mentors and teachers.

1. Digitalization as a form of manipulating human behavior in the Age of Surveillance Capitalism

The emerging form of society in which various digital systems, aggregators of AI-based big data, are used to control human behavior has been named by Shoshana Zuboff as surveillance capitalism [28]. A well-known economist, Nobel laureate Joseph Stiglitz in his book “People, power and profits. Progressive capitalism for an age of discontent” calls for considerable engagement of civil society, judicial and congressional oversight to ensure against the loss of privacy, political manipulation and market exploitation when using the digital social media systems [24]. Citing the sociologist Zeynep Tufekci, J. Stiglitz emphasizes that AI systems that are elaborated by the private corporations for the sake of their profits “... could exploit each of our weakness, an irrational desire for new shoes or handbags or trips to warm beaches, and feed us information that leads us to dissipate our incomes, our emotional self prevailing over our more deliberative self” [24p.126]. “Manipulation and control over human behavior on the basis of Big Data” according to Stiglitz’s opinion are well beyond Orwell’s imagination in the novel “1984” and another more recent novel “The Circle” by Dave Eggers. The famous economist proposes to set up certain requirements: “that data only be stored in an aggregate form, without individual identifiers (called anonymous) allowing researchers to glean information about behavioral patterns, but not to target individual” [24,p.131]. However, besides the state and public oversight of using Big Data for the benefits of society, there is a very important question about habits, skills, cognitive styles of individuals who work and live in digital environment from the early childhood.

There are periods in history when disruptive technologies transform and change the existing cultural practices as well as the forms of transmitting cultural values to younger generations. These immense and abrupt changes in functioning of cultural institutions could distort educational practices and even cancel cultural forms of interactions between child and adult resulting in an overall decrease in the level of intellectual and cognitive abilities. In that case, the task is to restore the cultural practices, their forms and content. Current

period is characterized by this challenge as digitalization in an imperceptible way, transforms the practices of mastering the cultural patterns and ways of action in different contexts of social interactions between a child and an adult for significant groups of population.

The digitalization in its common sense begins with a smartphone, an iPad, some digital games that are always around and, thus, it rearranges the existing established matrix of formation and coming-of-age of human consciousness and even developmental age and also reorients intentions and sensitivity in the contacts between a child and an adult. Parents are often really happy that their yet non-talking toddler so deftly presses the keyboard keys or is capable of “using the iPhone”. But this dexterous manipulation of a child is also available for senso-motor intellect of apes.

From a cultural-historical point of view, digitalization changes the natural established forms of interactions of a growing child with an adult and with other children. First of all, the child is overloaded and overstimulated by visual redundancy of stimuli from digital toys and videogames that are disconnected and do not correlate with his/her perception of natural surroundings, i.e. faces of his/her family members and relatives, natural landscape and everyday scenery. Interacting with a digital device and the screen, the child performs a set of operations that are not connected with a household actions in contact with an adult and other children. So the child is encircled with a specially constructed artificial “digital continent”. And this “digital continent” grips child’s attention. This “digital continent” is isolated and separated from the educational practices of mastering the cultural content in contact and in joint activity with adults and other children.

This artificial “digital continent” did not emerge by itself. It was designed and produced by commercial industries integrating the efforts of many specialists: from artists, game designers, animators, various programmers to marketing managers and even child psychologists. It has dark patterns. As Katie Davis explains, “Dark patterns are design features that are intended to keep users engaged with a particular device, platform or application, regardless of how their engagement might affect their autonomy or well-being” [21,p. 28]. But we can generally reconstruct how this specially organized engagement works. This constructed “digital continent” disrupts organic communication between a child and his parents in everyday situations and engages child’s attention stimulating his/her unauthentic behavior under a manipulated influence of a digital device. Paraphrasing a famous line by Lev Vygotsky – “the learning steers the development” (or social learning tends to precede development) it has to be said that in existing digital environment where the child is left on its own with some devices and is not directed in his activity by communicative interactions with an adult and other children, digital activation of behavioral reactions to the stimuli on the screen subordinates learning activity as well as the development of a child. As a Russian philosopher Sergey Smirnov states this: “If the process of mastering own behavior is delegated to an exterior carrier (for example, to

a smart technical device, gadget, digital system), thereby the human development, development of the higher mental function is debarred"[14, p. 69].

In everyday digital environment, digital activation of a child makes one feckless and does not serve any instrumentalization (learning of useful skills). The learning that steers education is always regarded by a child as a break-through to the new forms of interactions and mutual understanding between a child and an adult [10], to the new instruments of organizing the joint action with an adult and other children.

This research should be focused, according to S. Smirnov, "on the model of human mastering of his/her own behavior, it means mastering the self, own core that is given by the first birth, own reactions and affects... Exactly these acts of mastering own behavior by means of signs and psychological tools are acts of development that configure itself in units of activity structures, represented in conceptual constructs. These conceptual constructs overcome guesses and wool-gathering about system of human psyche"(Smirnov, 2021, p. 68).

Digital gadgets that are accepted as toys by adults and given as toys to a child are not toys at all. It is impossible to see those gadgets as toys because toys are specially created to amaze child and...to be broken by him/her. A child must break the toy, according to G.W.F.Hegel ("... the most rational thing that children can do with their toys is to break them", Hegel, G.W.F.,1990,Zusatz, p.50;also Tubbs N, 2008, p. 147) to understand its mechanism and to compare the toy as a mechanism with an alive creature — a plant, a bird, a human and so on . But the digital gadget can't be taken into pieces to re-integrate them back into a toy. The digital gadget is switched off, and then it is switched on to continue the same visual dynamics. The only operation a child can perform is to stop this visual dynamic.

This dynamic continues functioning limitlessly. And a consciousness in a child is absorbed by this visual dynamic willing to follow it. Therefore, this digital dynamics would isolate, set a child apart from an adult, from his/her suggestions and possibilities of communication and joint actions if an adult does not interfere with the interaction of a child with a screen of the device and if an adult does not subordinate child's manipulation to his/her communication and collaborative engagements with a child.

To master the digital gadget environment around a child and to restore the steering function of the learning for a child, an adult must be able to form a child-adult community surrounding the digital toys and to launch his/her own instructing and educating development meta-game. This meta-game is a game with a community around a child that transforms the rules of interaction between a child and the surrounding gadgets. Constructing and organizing such a meta-game, an adult- educator can achieve very important new results in developing and educating a child while mastering the elements of the digital environment. In a reverse situation, without any interference into the child's interactions with gadgets, this digital environment being specially constructed and organized by business development divisions and

operative units of corporations would steal the child from an adult-educator.

Driving the stimuli of digital activation results in changes of children behavior, transforming sensitivity, understanding and image formation. These changes must be the subject of basic research and require further in-depth examination.

In his research, Aleksander Veraksa [1] redefines and reiterates some conclusions of American researchers that are systematically scrutinized in the book of Michel Desmurget [22, p. 45–46] . A. Veraksa states that "with increasing screen time, children's auditory-speech working memory decreases, that is manifested in their ability to memorize and reproduce spoken text. At the same time, it does not matter whether this time is passive or active" [1] ."Children with a combined screen time of less than 1 hour a day have better motor regulation and self-control than others." "As the time in front of the screen increases, the degree of resistance of children to interrupt interaction with the screen device also increases" [ibid].

And other conclusions of A.Veraksa are very important and also proved out by the analysis of M. Desmurget [22]. A.Veraksa investigates the conditions when child's interaction with screen does not cause intellectual decline and decrease in self-organization. The screen is innocuous and inoffensive at least if interactions with the screen are mediated by cooperative engagements with adults and other children. "The children, who usually watch videos operating the control panel alone, have worsened their indicators of behavioral inhibitory control over the year" [1]. "The children, who usually watch videos operating the control panel together with siblings, the indicators for behavioral inhibitory control have not changed over the year." "The children, who usually watch videos operating the control panel together with parents, the indicators of behavioral inhibitory control improved over the year". "Children who don't play video games with digital devices create more detailed images than children who play video games". "Children who have experience using a gadget together with someone (parent, friend, sibling) have a higher level of imagination flexibility than children who use the gadget alone" [1].

Anyway, it is increasingly evident that the most important path to master the screen, gadgets and video games from the position of an adult-educator is to engage in unknown, unfamiliar and new using the device as a tool. This way the unfamiliar or incomprehensible situation for a child will require applying imagination, creating a new image and meaning for mastering understanding, entering the communication with an adult. And then the way of working with this image and its meaningful elements should be the basis of interaction between an adult and a child. In this case, a child, through overcoming incomprehensible elements and by the help of the imagination, goes on to grasping the reality that is formed in the interaction between a child and an adult.

However, contemporary digital gadgets manipulate children in their interactions with the screen, stimulating specific responses to the proposed visual dynamics through the operational uniformity supported by al-

gorithms embedded in the functioning gadget, and the illustrative superfluosity with an abundance of not meaningfully structured visual elements that capture attention. This operational uniformity consists in repetitive sameness of operations, provided by the digitalize system, without specially organized disruptions in interactions with interface to stimulate discovering new operational elements in cooperation with peers and adult. So interaction with digital system is mastered by child individually without communications with peers or adults. An abundance of visual elements is important for individual gaze. They attract the child's attention to new visual stimuli but do not initiate image analysis and visual understanding in communication with peers and adults to compare contrasting versions of grasped images by different children.

Most commonly, the existing digital interactive games and digital environment act on the principles of behaviorism: the presented stimuli lead to behavioral reactions of the child-player, and the feedback is received and is based on the operational-behavioral responses of a child-player, creating an illusion for a child of the open reality of action in the game environments. However, this is only a virtual reality that is not the reality of the ideational flow in joint actions and communication with an adult-educator and other children, this is the reality of the bioautomaton's functions that are now imitated by a child-player.

The digital system supports certain reactions of a child to the proposed stimuli. The child is unable to go beyond the stereotypical response scenarios and recursive scripts. The illustrative superfluosity, the monotonous operational manipulativity, recursive and constantly repeating behavior script form a kind of "dams of development" in which a child is getting stuck.

At the same time, the operational uniformity and illustrative superfluosity of digital systems hinder the development of thinking and understanding. Accustomed to the operational uniformity of the digital system, the child doesn't try to transform the operational units and find new, unfamiliar forms of operation. An abundance of visual stimuli draws the child's attention to the eye-catching but not to the essential elements. So he/she doesn't gain more insight into the situational problem. So typical digital systems reduce the ability to master skills such as transformative imagination and modelling. A digital screen as an opaque membrane sets a hindrance to mastering through communication and mutual understanding with an adult of the "language thinking" [18] and its forms of organization. This also distorts and sets a predicament for a child's mastering "the structures of thinking" that appear for the child later, and leaves in disarray, particularly the principles of classification thinking, as well as categorical thinking, including such categories as order, name, genus-type, quality, quantity, form-material, one-many. A child will not be able to master thinking structures that are embedded in language and in communicative speech forms, as he/she is not sensible to such structures and they are not obtainable and not discernable for him in a digital environment.

Moreover, a child will not be capable to manifest spontaneous unexpected gestures, expressions of his emotional mood in communication, acting on a stencil. New meanings and new forms of interaction with adults and other children do not arise for him/her being boiled down to standard reactions.

It should be noted that blocking the child-adult interaction at the pre-reflexive development stage, at the formative stage with repetitive interactions and digital screens is not the only problem. The underlying issue is that undermining this interaction means undermining one's ability to master new ways of action, thinking and working with knowledge (including the analysis of the genesis of knowledge). The cultural ways of action and connected with them abilities, as well as knowledge, are what determines the most important direction of human development when mastering one's own behavior.

2. Digital-algorithmic approach versus digital-cognitive approach in education processes

The previous chapter briefly outlines the introduction of a child to a kind of "digital continent" of gadgets, devices and computer games that oftentimes starts nearly at birth. The question is: how the task-oriented education system is organized in existing widespread digital environments based on the digital e-platforms, for example, the Sberbank platform and other e-schools? The author claims that those digital learning environments are dominated by and are built on the digital-algorithmic approach [8].

The digital-algorithmic approach to the organization of learning, implemented in electronic-digital environments, implies correlation of the student's answers with a certain established rule that is based on a given set of operations to obtain a desired answer. Within this approach, the student is forced to guess the sequence of operations in order to get the right solution. Students really give the correct answers, verified by the electronic device, however, these digital environments are not ensuring the conditions necessary for the identification and analysis of the domain-specific subject matter and of semantic aim-oriented components of thinking and action. In addition, the processes of understanding, reflection, modeling, mutual understanding and communication that determine the patterns of students's development in learning do not receive adequate support in such systems and are not represented in them. In such environments, it is impossible to organize the self-determination of the student and to ensure his/her upbringing and character building.

Digital educational resources developed on the basis of the digital-algorithmic approach are a kind of "repository" of curricula and manuals translated into digital forms. They are boring for children and rather serve as an instrument of control where a real teacher is replaced by an automatic check. The ways of providing data and information in such systems do not allow organizing full-fledged educational, research and project child-adult educational communities, and, as a result, do not allow mastering knowledge in accordance with the age characteristics of the children development.

This article suggests a different digital-cognitive approach as an interdisciplinary initiative of educational psychologists and researchers of next-generation AI. In this case, digital systems act as a form of representation of possible scenarios and scripts of action and communication, they can become the subject of analysis and transformation. Analyzing the data on the possibility or impossibility of implementing an action in this situation, students reconstruct the way of joint action on the basis of a digital model in interaction with an adult-educator or mentor, identifying the conditions for its implementation.

The most important element of the digital-cognitive approach is a digital dynamic model of activity and actions, and communication itself. P. Skobelev has elaborated a semantic web model that represents the scheme of action [12, p. 24].

This model is implemented on the basis of emergent swarm intelligence and special semantic web structures, simulating the reproduction of different wholes by the participants, which are an act of thinking, an act of communication, an act of action.

A variation of such digital educational system consists of the following important subsystems, according to P. Skobelev [12,23], the developer of emergent swarm AI and multi-agent environment based on next-generation AI:

Autonomous digital twins in the form of program agents of a specially designed research and educational environment. There may be a student's program agent (student's digital alter ego), a teacher's program agent (teacher's digital alter ego), but a concept as program object, a program object of a certain geometric object, such as a triangle, can also be elaborated. What does it mean?

Student's program agent (student's digital alter ego) – is a computer model of the student with knowledge and possibilities that are increasing as a result of successful learning when the student is equipped with tools and instruments. Student's digital alter ego is indexed by a real student. These indexes denote what this student's program agent also “knows”, how it changes.

Teacher's program agent (teacher's digital alter ego) – is a computer model of the teacher that is indexed and specified according to the options of a real teacher: which instruction method is used: from example, top-down approach or bottom-up approach.

These student's program agents and teacher's program agents pave the way to representation and stimulation of communicative processes between members of a learning team, learning design and learning research teams among each other and with teachers and mentors.

Multiagent environment means forming the “worlds of action” on the basis of digital twins of the elements in the concrete situation: roads, trees, mountains – are the elements of specific spheres/situations where the actions are executed. What is more, the “worlds of reasoning” are also emerging with digital twins of ideal objects: shapes, models, operations.

This approach involves acquiring the formalized knowledge bases with collection of scenes and problem-based situations.

A collection of scenes and problem situations, representing learning routes of increasing complexity in the learning content, are combinations of objects with their states, and also initial given data for solving the problem. The general principle is presenting a chain of inventions and discoveries that must be passed through by

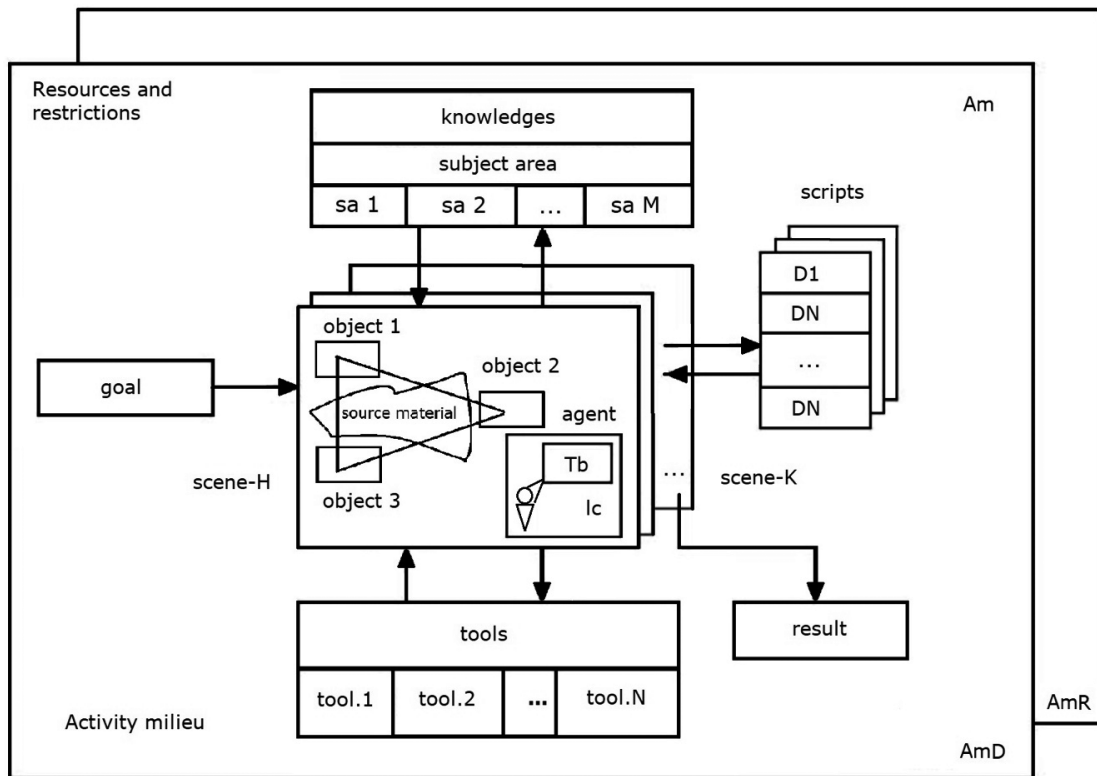


Fig. 1. Activity milieu AmD & AmR

the learner on his/her own during the training process, reinventing the wheel again, rediscovering everything that happened in the history of the given subject area (tracing epistemological genesis of knowledge) for each individual (Skobelev, 1992).

A key element of the digital environment according to the cognitive-digital approach to the organization of learning systems becomes a digital dynamic model of the way of action. At the same time, the digital dynamic model does not substitute for a real situation of action, but is "suspended" in a kind of "ether" of interactions and mutual understanding of participants to link "the worlds of action" and "the worlds of reasoning" as another mediating element of the situation besides the two "worlds". This allows to simulate and reproduce a thought act among the students and a teacher. The most important characteristic of this act is modeling a situation and processes in it. The participants are examining the digital dynamic model that is demonstrating all the possible ways of action with the objects that are part of this particular situation.

Within this approach, a special type of action is being designed in educational situations when dynamic digital models become the subject of analysis for the child-adult community to reveal the form of organization of joint action and communication of group members based on the tasks of game-learning activity, of learning activity, learning-research activity and of learning-design activity. In this context, the proposed visual items and operational units in digitalized simulative environment are analyzed and considered by the teenagers in communication with the teachers and their peers as a sense bearing symbols and schemes, representing the personal understanding of the situation by the different participants of a team. Working with these digital models, the teenagers master the methods of design, research and meta-gaming activities. A consistent implementation of this approach should serve as a cornerstone to a digital platform of the Russian school of the Future [7].

The most important substantive question is how a dynamic digital model actualizes for an individual student the integrity of thinking in the form of a thought act or for a group of students in the form of a system of distributed and conjugated actions that form a kind of a "skeleton" of a thought act. As if this happens on the basis of a dynamic model in a digital environment, collective thinking of a group participants starts being modeled.

It is worth noting the way of action to create the object of thinking is revealed and represented on the basis of the dynamic model of the simulated thought act. A dynamic digital model for students and teachers sets not the final image of an object in thought process, but the very way of action that generates an object of thinking.

A very similar approach of involving students into thinking was applied by V.V. Davydov [6], the creator of the revolutionary practice of education and teaching of thinking. For him, the scheme of action and the scheme of the object were different. Reflexive thinking grasped this difference and turned it into a meaningful scheme of thought. Special ability (the ability formation) of

thinking consist in grasping polyphonic lines of thought processes — convolving and unfolding an action scheme into the object scheme and an object scheme into the action scheme to find parallel correspondence between the forward and reverse transactions. Therefore, according to Davydov's thinking and the thinking pedagogy, the thought is always practically realized in the form of a concrete action in a situation.

Thus, the digital-cognitive approach allows to implement this distinction between the scheme of the object and the scheme of the way of action generating the object in the learning situation to reveal for the students the conditions when the action in thinking turns into an object of thinking.

In this case, the central moment of the implementation of the student's action is a meta-game of the students and the teacher on "hacking" (transforming) the established rules of the digital game in which they are engaged, and changing the scenarios given in the digital platform. The development of such increasingly complex games based on digital systems has been initiated by the "Kruzhok Association" (Association of technological clubs) in Russia. This "hacking", first of all, is connected with students awareness and reflection on the game rules and the game script as well as with suggesting alternative scenarios and plans to organize the collective interactions concerning the script embedded in the proposed digital game. What is more, there are some concepts and claims to change the "digital engine" of the game. In order to implement this changes, the "Kruzhok Association" (Association of technological clubs)[15] advocates for mastering not only methods of directive programming, but also event-driven programming and programming states machines.

With such an approach to digitalization, there is a possibility for the exteriorization of abilities — one of the members of the team who identifies the way of action while working with a dynamic digital model, can actually rebuild it, thus, being able to act in a new way. It means that the ability to act is exteriorized as the possibility to realize and identify the new way of an action. For other students, it turns out to be interconnected with grasping/not grasping a new way of an action carried out by one of the group members and outlined in a digital dynamic model using special signs. Such an exteriorization of the ability, the external representation of the ability through the representation of the way of action and its semiotic fixation with the help of signs in a dynamic digital model, allows us to look at the processes of the ability formation from a completely different angle.

Thus, using the means of an activity approach as the *main alternative to existing approaches to digitalization of education* could be summarized as follows. 1. With a digital-algorithmic approach to digitalization in education, it is considered as a special type of simulator for students to practice a given set of operations until it becomes second nature when performing tasks on a digital device, and the result of their performance is controlled.

2. The cognitive-digital approach creates special situations in which the student and the study group have to

change the subject of the operation in order to solve the problem, transform the structure of the operation, differentiate new units within the operation, create another form of symbolic representation of operations and schematization of the subject of action. In the conditions of collective work in a group it is also necessary to create new forms of communication in order to draw the attention of the members of the study group and an adult to the representation of the operation by means of signs.

3. The digital-cognitive approach allows not to identify the modelled object with visualized models, but to consider and identify the limitation of modelling tools, the non-identity of the simulated object and the model. This approach should be seen as a continuation of the work of V.V. Davydov, which is devoted to the study of the structure of the act of thinking [6].

The alternative to the traditional approaches to the digitalisation of education conceptualised in this way requires a more attentive attitude to the theoretical legacy of V.V. Davydov, the prospects for the development of the practice of education outlined in it.

It is possible, following the idea of V.V. Davydov [5] on the special importance of mastering the way of action in a situation as the basis of ability formation, to assume that the true protagonist in the theater of human subjectivity — in the processes of psychical development, — are not the psychical functions, but “abilities”. The psychical functions were articulated and proposed to be the subject of psychological science as a result of the introspection of the German 19th century scientists with background in Physics (V. Wundt, G.T. Fechner, etc.). This was carried out in the structure of an experiment but connected with the functions of consciousness considered much earlier by R. Goklenius and P. Melanchthon in German scholastics.

It should be noted that L.S. Vygotsky's theory of interiorization discussed not the “abilities” and the processes of mastering ways of action, but rather the psychical functions.

The ability differs from a more abstract psychical function due to a number of reasons. First of all, the ability is based on the development of a way of action; secondly, it is necessarily connected with the situation of action, its context, its uncertainty; thirdly, the ability finds its realization in action; and, finally, it is connected with the mechanisms of consciousness. Thus, the introduced models of the mode of action mastered in the formation of abilities provide ground for overcoming the theory of abstract psychical functions coined initially by W. Wundt. It is the abilities, not the psychical functions, that come out of the secluded corners of consciousness right onto the scene becoming the acting characters in the drama of development of a learner in interaction with other participants of joint actions.

In the famous statement of L.S. Vygotsky “every psychic function appears twice in the course of child development: first, in an collective activity conducted by the adult — intersychic function — and second, like an individual activity, like an internal propriety of the child’s thinking — intrapsychic function. ... [2]”, in the great theater of human subjectivity development, as it seems

for the author, the replacement of the protagonist should occur. The following happened earlier: instead of a living acting hero, a man of flesh and blood — a mastering ability in the form of a demonstrated action pattern — his shadow was invited to the role of the actor — a psychical function, created by the introspective psychology on the basis of introspection.

But the protagonist — the ability — has a different fortune. The ability is simultaneously exteriorized, socialized, overgrown with accreted competence characteristics due to the external assessments of human actions; and also individualized, subjectified, overgrown with internal feelings of regulation, starts being controlled by the concrete person. The processes of interiorization and exteriorization are carried out simultaneously when mastering the ability. This is why the L.S. Vygotsky’s interiorization theory can not be applied to the processes of mastering the ways of action.

Such understanding of ability allows us to assert that the psychical function is a Wundtian abstraction, being a shadow twin of the ability. The ability, if purified from its social existence, from the way of action and from the regulation on the consciousness basis of the mastering actor, turns into a psychical function. This psychical function can be both shifted into the relationship between people, and then placed in the inner subjective psychological world of a person, while remaining the same psychical function. In the famous text of L.S. Vygotsky about development of inner speech and its functions in child’s development “the inner speech” is not just a psychical function [2].

The regulation of the ability and the ability formation operate differently. Both an adult and a small child are actually given consciousness as a special type of sensitivity. This sensitivity gives an opportunity to simultaneously be included in interactions with other people and regulate your own abilities, subjectively mastering the ability formation of oneself [5].

Therefore, the real protagonist that comes to the stage of the human subjectivity theater is not a psychical function, but rather the ability. The ability appears on the stage twice: first, as a fascinating strange inaccessible action of a skilled person — an adult or an older child, and, the second time, as a child’s own action. Someone else’s skillful and dexterous action is observed from the outside, but it is also tried on as a future own action from the inside. One’s own probing action is connected with some internal sensations and regulation, but at the same time it is a subject of communication with other skilled and experienced people, with an attempt to look at one’s own action from their positions, through their eyes.

Therefore, the restoration of the actual theater of human subjectivity requires allocation of an entire set of acting characters in the form of mastering subject matter abilities (retell a fairy tale, ask adult a question, answer a question, draw a picture, dance, write a story, read a text, add, subtract, multiply, present operations with numbers as a formula, etc.) and metasubject abilities (to understand, to communicate, to carry out reflexive thinking, to solve a problem, to make a scheme, to self-

determine, to make a plan of action or to form a scheme of the operation etc.).

This circumstance has received quite a thorough attention in the works of V.V. Rubtsov [11], V.I. Slobodnikov [13], E.E. Shuleshko [17]. They demonstrated that formation of the ability happens simultaneously with the process of entering a child-adult educational community of the skillful and dexterous persons (able to read, write, solve problems). This is proved by the fact that exercising and realizing the ability is ensured in this community of a teacher and students mastering this ability.

When a child is play the common today digital games or with gadgets in the digital environment, he/she has no interest in peering at the action of an able-bodied person or trying to repeat such an action, analyzing what he/she cannot achieved, listening to the advice of an adult teacher. A type of chaotic search activity, that the digital gadgets are habituating us to, should also be specially studied from the point of blocking and reducing the communication with an adult to the exchange of signals. What is more, this type of behavior also results in active search for more effective actions for all the participants of the situation, transforming the very form of joint action.

Another type of the educational digital environment of a cognitive-digital type, is currently developed by Y. Gromyko V. Rubtsov [8], P. Skobelev [12], and the "Kruzhok Association" (Association of technological clubs). This type of digital environment implies modeling and representation of the way of action in the structure of a thought act, sometimes demonstrates the specially organized impossibility of its implementation under the given conditions, which requires communication with other team members and a teacher. Thus, the sought way of action would be a new type of communication between a student and a teacher and within the student team, which had to be initiated.

An adult teacher should pull a student out of the operationalistic events of "pressing keys and buttons" in individual behavior mastered by him/her to a new COLLECTIVE JOINT action on another subject material and operationalize this completely different type of action, schematize and present it with the elements of a dynamic digital model, thereby making it the subject of transforming the way of action. An adult teacher turns out to be constantly engaging the student in a new SOCIAL-COLLECTIVE and previously unknown practical manifold and helping him/her understanding and mastering it.

Here, at this point, we see the most important node of the transition from the cultural-historical psychology of L.S. Vygotsky to the cultural-historical psychology of Vygotsky-Davydov as a single process, but with the most important element of the development of this tradition based on the introduction by V.V. Davydov of new ideas about the development of human mastering ways of thinking in education.

V.V. Davydov was building an educational practice of thinking when no object of thinking formed and embedded in knowledge system could be taken in a ready-made form. To master the object of thinking, it is nec-

essary to reveal the genetically original way of action that generates the object of thinking. In fact, the way of action that generates the vision of an object through an operational "explosion of immediacy" (i.e. a new operational piece-unit of action discovered by the student in communication within the child-adult community) has never been equal to the original object of ready-made knowledge represented in verbal formulations. Thus, only mastering the way of action that generates the model of an object, the representation of the object in a symbolic form, leads to the ability formation of concrete thinking. Actually, this approach implies that the world of ready-made knowledge is required to be alternated with the practice of ability formation, meaning that every education situation should be based on the need to search and discover a way of action every time. The elaboration and implementation of the digital-cognitive educational environments of the new generation can ensure the formation of practice of thinking in accordance with the ideas of L.S. Vygotsky-V.V. Davydov for different age groups of students.

V.V. Davydov elaborated on a number of ideas and concepts of L.S. Vygotsky. L.S. Vygotsky was strongly against the impending behaviorism in the whole set of social practices, likening human actions to the behavior of a rat in a maze analyzed through the "stimulus-reaction" lenses. And today's digitalization language is still a behavioristic one. But the lack of an activity language, which he was just beginning to create and elaborate, did not allow him to describe a person's real practical experience in educational practices, theater practices, therapeutic practices without applying the language of behaviorism. L.S. Vygotsky was only forming the language of human self-growth as a language of activity in the development of cultural tradition beyond the boundaries of behavioristic psychology, gestalt psychology, psychoanalysis, using the main achievements of these areas of psychology.

Therefore, a number of concepts used by L.S. Vygotsky bear the vestiges of behaviorism – mastering "one's own behavior", and not the way of action, thinking, mutual understanding [V.V. Davydov], "autostimulating own behavior", a "technique of double stimulation", and not the transformation of a sign into a means of controlling intentional relations of consciousness, not the management of a semiotic sign's referring to the singled out object of one's own action and so on.

The genius of L.S. Vygotsky lied in the language breakthrough: he sought to create a new language for analyzing the human practice from the standpoint of culture and diverse cultural practices. This was the language of human activity, which was noted by A.N. Leontiev and V.V. Davydov [9], despite the absence of the "activity" category in the L.S. Vygotsky works.

However, to a certain extent, the activity language of L.S. Vygotsky was a more complex one than the activity language of A.N. Leontiev, his follower. This is explained by the fact he intended to keep the processes of thinking, the processes of speech (communication), the processes of voluntary action of a person in a situation as a whole. This particularity demonstrated in L.S. Vygotsky

works, was reproduced at the end of the 20th century within the framework of G.P. Shchedrovitsky's system-based thought-activity approach [18,19]. He developed a scheme of thought-activity, which presents the processes of communication, action, thinking (Fig. 2).

Integrating the processes of action, thought-communication and thinking into a single systemic whole with the scheme of thought-activity made it possible to identify and externalize the processes of reflection and understanding and its specific functions in thought-activity. The processes of reflection and understanding ensure the connection of the processes of action, communication, thinking with each other. This connection is achieved by transferring the results of reflection and understanding from one type of thought-activity process to another (see Figure 3). Reflection provides the disclosure and transfer of means and methods of transformation, and understanding provides the transfer of meanings and imports from one process to another. The unity of the

consciousness of the participants in a situation of joint action and the achievement of mutual understanding is ensured by generating new means of expression and controlling the results of the participants' understanding of interactions when using these new symbolic means.

This language of thought-activity was especially represented in L.S. Vygotsky's work "Thinking and Speech"[2]. Thinking and speech are not human behavior, these are socio-cultural processes, and their development distinguishes humans from animals. Introducing and elaborating conceptual vision of socio-cultural processes, L.S. Vygotsky had been "pulverizing" the behavioral language, freeing himself from it and going beyond it. But the traces of behaviorism remain in some of his various works. L.S. Vygotsky did not have a common conceptual name for socio-cultural processes, which he began to turn into a subject of study. The general category for these processes appeared much later thanks to the works of A.N. Leontiev and S.L. Rubinstein. The

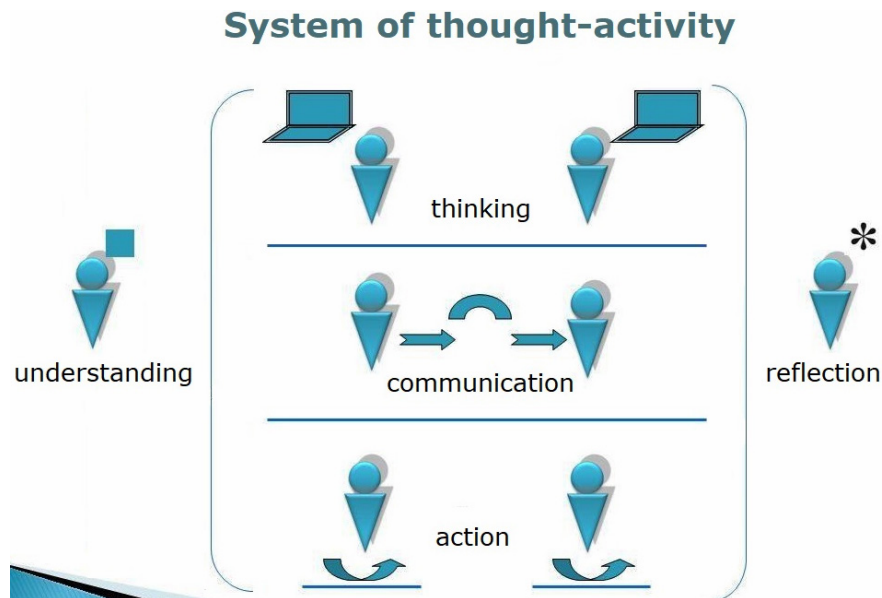


Fig. 2. Scheme of thought-activity basic processes

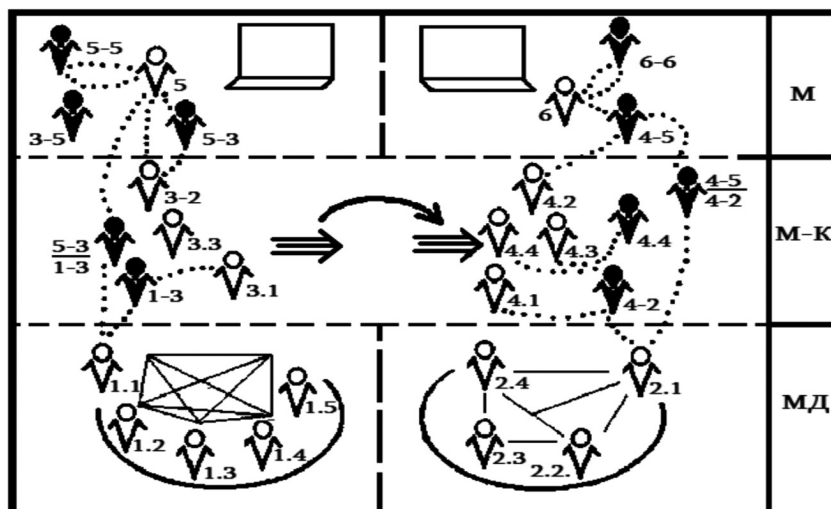


Fig.3. Thought-activity scheme with reflection and understanding

main characteristic of these socio-cultural processes is that they are a form of cultural and historical reality, called activity.

The concept of “activity” is difficult to translate into English, because in English there is no distinction between “deyatelnost” (active in specific socio-cultural context) and “aktivnost” (active as opposed to passive). Thus, one needs context to interpret when it means activity as opposed to passivity (“aktivnost”), and when it means special cultural and historical reality, called activity (“deyatelnost”).

L.S. Vygotsky did not use the term “activity”, but the description of the processes of thinking and speech are related to activity. According to V.V. Davydov, “Thus, already in the mid-20s, L.S. Vygotsky, as a “very educated Marxist,” had a historical and sociological concept of practical, sensual activity of people. Moreover, he clearly understood the role of such essential component as “instrumentality” (in Russian – orudiynost, opssredovanost) in it, putting its study as the basis for the research of his scientific psychological school” [8,p.23]. Thus, L.S. Vygotsky did not use the category of activity, did not develop models of activity, but freeing himself from behaviorism schemes, he relied on the historical and sociological representation of practical activity. And this was primarily determined, according to V.V. Davydov, by the development of ideas on instrumentalization of the psychical processes by the means of signs that are used as special tools. Moreover, L.S. Vygotsky’s conceptual description of the processes of mastering thinking and speech by a child in interaction with an adult is the first attempt to identify the activity mechanisms of these processes in psychology and anthropology. The next concrete step in the study of the process of formation of thinking in modern educational practice was made by V.V. Davydov who elaborated a method to initiate child’s mastering the integrated way of action [5,6].

The modern, most specific conceptual representation of activity is the system of thought-activity as a unity of three processes in their interrelations and interconnections with each other – thinking, communication, action. Two of these processes – thinking and speech (forms of communication) in their unity were considered by L.S. Vygotsky. The third process, the process of action, was identified and described in the studies of Soviet psychologists – A.V. Zaporozhets, P.Ya. Galperin, D.B. Elkonin, G.P. Shchedrovitsky. After all those processes were studied, analysed and described, a new problem was formulated: how to present these three processes in unity as an integrative whole and totality, as the most concrete representation of the activity. This was done by G.P. Shchedrovitsky by creating a scheme of the thought-activity and the system-based thought-activity approach.

3. Conclusion: developing psychology theoretical toolkit in the context of digitalization

However, such conceptual vision of activity as thought-activity problematizes the language of psychol-

ogy and psychology itself as a discipline within the tradition of cultural historical psychology. The question is what is “psychological” in this idea of thought-activity? After all, neither activity in general, nor thinking, nor action, nor communication are specific psychological subjects of study. These processes require interdisciplinary and transdisciplinary approaches for their study and analysis – psychology, logic, sociology, semiotics, linguistics, cultural studies, anthropology. Neither thinking, nor mutual understanding and communication, nor action can be reduced to psychical processes.

Moreover, these notion of activity as a concrete unity of three processes of thinking, action and communication means development of three languages: the old language of higher psychical functions (perception, memory, attention, imagination, thinking, will, emotions and affects) should be preserved; the language of intellectual processes – thinking, communication, actions, and ways of organizing these processes should be developed and articulated further; and the language of states of consciousness should be introduced. The unity of these three languages of psychology is ensured by a single ontology of thought-activity processes integrating all the three languages.

The ontology of psychology is a thought-activity system, but these three languages are to be used for researching specific subjects and designing humanitarian practices. The conceptual “alphabets” of each of these languages should expand and increase. For example, Oleg Genisaretsky [4], expanding the systemic typology of mental functions, was introducing the idea of a new psychical function – “proception”. However, the most interesting phenomena here is the interpenetration of these three languages into each other, their interweaving and mutual influence.

This typological expansion of the conceptual units and the increasing richness of the three different psychological languages must be achieved not only on the basis of the academic inventions of anthropologists, psychologists and philosophers, but should be applied for the analysis of a modern psyche, the forms of the organization of consciousness that are being transformed under the influence of the digital environment. One of the preliminary examples of such analysis is the work by Yuk Hui [26,27], who demonstrates that the disseminated digital object subordinated the organization of commercial and political ads, classical and abstract art, poetry and literature, by substituting attentive immersion in subject matter with instant browsing.

An algorithmized digital construction confines the perception of the new to the past operationalized reactions, asking to slough off the digitalized carapace of extrapolation of the past into the future (everything has already happened!) due to the experience of being present and spontaneously acting in this situation as a moment of affirmation and awareness of life. The digital construction of behavioral reactions should not replace the assertion of genuine values in a new situation, should not substitute the reality of an event with a possible visual scheme, reducing the truth to virtual interpretations, should not loosen moral restraints and turn into a su-

perforial digital performance and abstract digital-visual schemes, deeply personal and shameful experiences because such simplifications destroy human nature. Therefore, anthropology, theory of consciousness and psychology are today an open field of battle for the humane in man. And this involves reconstructing the events of consciousness and experience in the whole field of unfolding practices of digitalization.

Psychology, anthropology and the theory of consciousness must once again break out of the suffocating confines and enter into the field of struggle,

where the danger of destruction of the humane in man is growing. This paves the way to studying the formation of the uplifting “superhuman” and “holy states”, the practices of overcoming [20; 16] “human, all too human” (Friedrich Wilhelm Nietzsche). This is what is fundamentally important when considering and analyzing the processes of digitalization, as well as designing such processes of digitalization that can increase intellectual abilities (thinking, action, understanding, reflection, mutual understanding, schematization and others).

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L.S. Vygotsky and the Digit: Challenge for Cultural-Historical Psychology

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The article ponders, if it is at all possible to include digital technologies into the process of mediation. The latter being the core of cultural-historical psychology by L. Vygotsky. In order to facilitate the discussion, the author outlines the nature of the virtual world, made by digital technologies. It was postulated by a number of researchers that digital technology could serve both as a tool and as a sign. And so — it can be part of the mediation practices. This article claims that digital technologies create a unique environment (virtual reality) that dictates particular ways of conduct, especially for children and teenagers. The author demonstrates how digital technology creates splinter segments in the mediation process, which makes an adult to leave the communication with a child. Which leads to so-called digital chasm, and a child descends into the virtual reality without living through the mediation process. This is why we claim that digital technology can't serve as a sign, the way Vygotsky describes them. The article lists parameters and consequences of the digital schism, such as: event shift, narrative intervention, inversion of functions and flattening of the horizon of meaning. The article proposes a solution — a construction of a search scenario in schools. This search scenario consists of several stages: challenge, analysis, ask-search, discussion, reflection and articulation of knowledge. Each of these stages can include digital technologies in various ways. The article concludes the algorithmic nature of modern schools makes a pupil's behaviour "digital" before digital technologies themselves. And so, in order to overcome the digital schism, one needs to establish search scenarios as a teaching model before introducing digital technologies during a lesson.

Keywords: digital technologies, cultural-historical psychology, L. Vygotsky, mediation, search scenario, digital chasm.

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Л.С. Выготский и цифра: вызов для культурно-исторической психологии

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В статье ставится проблема принципиальной возможности включения цифры в модель опосредствования, выступающей в качестве ядерной в культурно-исторической концепции Л.С. Выготского. Автор проблематизирует эту задачу через обсуждение природы виртуальной реальности, созданной с помощью цифровых технологий. Согласно уже существующим допущениям разных исследователей, цифра выступает одновременно как орудие и знак и поэтому может быть использована в практике опосредования. В статье обосновывается, что цифра выступает характеристикой особой среды обитания, виртуальной реальности, которая диктует определенный способ действия и поведения, особенно для детей и подростков. Автор показывает, что цифра совершает расщепление в модели

опосредования, в результате чего взрослый уходит из коммуникации с ребенком. В результате происходит так называемый цифровой разлом, согласно которому ребенок погружается в виртуальную реальность, не проживая акта опосредствования, а поэтому мы не можем говорить о том, что цифра играет такую же роль психологического орудия, описанную у Выготского, которую играл знак. В статье приведены характеристики и последствия цифрового разлома, такие как событийный сдвиг, сценарный захват, функциональная инверсия, сплющивание смыслового горизонта. В статье предлагается рассмотреть в этом случае использование цифры при построении в школе поисковой ситуации, состоящей из нескольких этапов (вызов, осмысление, поиск-вопросание, обсуждение, рефлексия, знаниевое оформление). На каждом этапе цифра может быть использована в зависимости от задачи и в разном качестве. Выводом работы является утверждение, что алгоритмизация поведения ученика, доминирующая в массовой школе, провоцирует цифровизацию поведения еще до цифры. В этой связи для преодоления цифрового разлома необходимо еще до внедрения цифровых технологий на уроке выстраивать проблемно-поисковые модели обучения.

Ключевые слова: цифра, цифровые технологии, культурно-историческая психология, Л.С. Выготский, опосредствование, поисковая ситуация, цифровой разлом.

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Mediation and the digital

Digital technologies (in the broad sense, the digital), which are being actively introduced into various spheres of life, have become a serious challenge for the humanities, including the Lev Vygotsky's cultural-historical psychology (hereinafter referred to as CHP). In fact, all the world anthropological and psychological concepts known to us and still serving as the basis for humanistic were developed in the pre-digital era. The digital, therefore, did not appear in these concepts. Studies on both the role of computer and information technologies in human development and the associated risks were already carried out in the 1960s¹; however, the basic CHP postulates have not been fully verified with the digital. And the challenge here lies precisely in the fact that it strikes at the very CHP core – the model of mediation.

What is the subject matter of this challenge and the related problem situation for researchers?

The CHP postulate states that all “higher mental functions <...> are mediated processes, i.e. their structure comprises, as the central and major part of the whole process, the use of a sign as the basic means of directing and mastering mental processes” [2,

p. 126]. According to Lev Vygotsky, the act of development is always presented through the act of mastering a person's behavior by means of a psychological tool (sign). The latter differs from tools of labor in its *orientation* – inwards, to its own mode of action (in contrast to the external object-tool, directed outwards, to the object) [3, p. 90]. This difference is grammatically embodied in a key concept, in a change in the suffix: when acting on an object, the subject performs an act of mediation, acting through a tool. When influencing oneself, the subject performs an act of mediation, mastering one's behavior, acting with the help of a sign².

What does mastering one's behavior mean? It means mastering a mode of action by a person (a child) with the help of an adult mediator and use of a tool and, thereby, shaping one's own subjectivity. To be more precise, when mastering a mode of action, the latter “enters” an individual, becoming the new functional organics of that person, who forms a new “functional organ”, as V. Zinchenko liked to reiterate³. It is important to present the process of mastering a mode of action as a subject actually living the very process of mastering. As B. Elkonin writes, it is important to understand how a stimulus that was previously external to an individual turns into

¹ По See, for instance [1]. For obvious reasons, it is impossible to imagine construction and description of a mediation model in these works that involves the digital. Nevertheless, the authors tried to dispel a number of myths created by various representatives of transhumanism (for example, the myth according to which the brain thinks, and therefore it is possible to develop an artificial intelligence model based on brain activity analysis as an example).

² This distinction disappears when translated into English. All translations use the term *mediation*. Moreover, Western authors, including CHC followers, focus on the instrumental side of an act – on the action of a subject with the help of an instrument. One half of the act of development (mediation) is discussed; the other, the main half – mastering one's behavior – is forgotten (for more detail, see [11]).

³ In writing, for example: pen – hand – arm – local zone in the brain in the form of neural connections.

an internal means, or how a sign “turns into an internal means of constructing an action” [15, p. 233]. This is the key CHC issue. Rather than how a stimulus that has become a means works, the question here is about a stimulus becoming a means, in living through the “interval” within which a stimulus is transformed into a means.

The point is that the very act of mastering involves effort, experiencing and living through the inner sense of oneself. B. Elkonin (with reference to the works of Lisina, Zinchenko and Gordeeva) fixes the key problem that the completeness of an act of *mediation* presupposes living through personal effort, “a sense of one’s own activity”. A person (a child) physically lives the act of mastery, overbears this act, living it in the fullness of self-feeling; seeing, hearing and feeling a psychological tool physically and sensory, with one’s body. That is, the means through which a person masters a mode of action with an object and thereby masters oneself, one’s affect, is felt bodily, sensory, in the fullness of presence. In principle, various modes of action and basic activities are mastered, for example, reading, writing or dancing. It is the emphasis that is important. The core of the mediation model is not just mastering a cultural tool in itself but whether a person further masters one’s mental processes with the help of these means and whether the formation of a new personal organics further occurs through the process of mastering? In other words, a person can master an external action of a pen when writing. Or can learn to read and somehow start reading. But the question is different: does a person master oneself, one’s affects, doing actions with writing or reading, control one’s writing with a pen? What is the fullness of living and managing this living?

Some scholars, including the author, already put forward an assumption that the digital (digital technologies) constitute a new *means of mediating* [9; 10; 11; 12]). At the same time, according to O. Rubtsova, digital technologies act both as a tool and as a sign [9, p. 121–122]⁴. Yet if the digital is a sign, then what way the digital is mastered as a sign and what does a subject of action, a child, feel when operating the digital? Isn’t such an assumption an oversimplification when we consider the digital a sign and a tool? I believe that the digital is more than a sign and a tool. It is a new type of environment where a child lives. Moreover (and this is the main thing), in this environment there is no adult mediator familiar to us.

Lev Vygotsky once noted: “<...> the inclusion of symbolic operations enables emergence of a psychological field with a completely new composition that is not

based on the existent in the present, sketching out the future, thus, creating free action, independent of the immediate situation” [4, p. 50].

Lev Vygotsky makes using a psychological tool and creating an opportunity for a mediated mode of action in a semantic field directly dependent, in isolation from the current (visible) situation. The action mediated by the sign and its mastering (appropriation), and the mastering of oneself through it are carried out substantively and bodily. And the subject controls this action, rising above the current situation, from the semantic field.

It refers to the effort associated with overcoming the current situation “by building one’s own field of action, deliberate in its dynamics and mediated in its structure,” as correctly noted by A. Egorova [7, p. 18].

What is essential for us to understand here? It is important to pinpoint that the act of development is built in conjunction with mediation and mastery, when the very sequence, logic and structure of the action of mediation and mastery is anyhow lived and experienced directly-bodily and sensually, by all senses. A child sees, hears and feels with one’s hands an object and a sign that becomes a psychological tool and means; more precisely, this object and sign is sort of drawn directly by the entire personal organics of the child. For example, the child writes the first letter on a blank sheet with the whole body. Although the sign itself is not felt, the very act of writing the sign is experienced. The pronunciation of the first word during the act of reading occurs with the whole being. A sound is pronounced aloud, through the voice and through the whole body, hearing which the speaker masters both the sound and the letter, and through this – oneself.

At the same time, a child controls oneself from the semantic field being above the current situation. If a child does not rise above one’s corporeality and the immediacy of living, then a child will depend on one’s affects and will not be able to turn the stimulus into a means.

This combination of acting in the semantic field, from which the objective action is controlled, and living the act of mastery in the directly sensory-and-bodily field sets the entire energy of the development act. In this sense, it *takes place*, that is, it *occurs as an event*. It is visible, it is lived through. Again, let’s ask ourselves a question – does a human stay in a virtual environment created by means of the digit also occur directly object-bodily and does it take place? Or does such a stay lose the coordinates of chronotopos, that is, its own presence and eventfulness? And if eventfulness still takes place, then what is its quality?

⁴ Additionally, taking into account the above, these works are still more about the tool aspect, rather than the aspect of self-mastery. That is, the digital acts here as a tool and a sign, but in a tool sense. Humans can already do a lot by means of the digital. But the main question remains – what is self-mastery with the help of the digital and does the digital become part of a new functional organ?

In a series of experiments, B. Elkonin and A. Egorova showed that it is precisely this kind of living a sense of one's own activity that is important when mastering a psychological tool [7; 8; 15]. They pointed at the phenomenon of mastering, appropriation of a sign by a person, appropriation of one's own mode of action. As it was evidenced, it is in acts of mastering one's behavior that the act of mastering oneself can be lived and observed. They demonstrated that in the interval of mastering a psychological tool as a means of a mode of action, it is important to feel action with it: it is necessary for a tool to become sensitive to the object of its application, make it possible for the hand to feel and the eye to see: "Such a testing of a means — a test of the tangibility of its action — is a necessary subjective moment in mastering the mode of action" [15, p. 234]⁵.

Additionally, the subject of action itself must and wants to see oneself in this living of the moment of mastering and appropriating a mode of action, — not a blind reactive being, but an active subject controlling the act of its own mode of action.

Elkonin and Egorova reached the conclusion that the very act of mastering a mode of action needs strengthening the vision of the very situation of mastering, so it is necessary to build means to strengthen one's own vision. If a subject does not see the situation itself and oneself in it, does not live through one's own feeling of an act, the mode of action does not become one's own, appropriated, but remains alienated, and, therefore, is not mastered [7, p. 20].

Having applied the above requirements to the model of mediation and mastery within CHC framework, let's again put forward the questions:

1. If it is assumed that the digital is a new means of mediation / mediacy, then is it possible to say that it plays the role of the same psychological instrument lived by a person, with the help of which an individual masters one's behavior?

2. If the digital plays the role of a psychological tool, then is it possible to say that the subject also gains and masters it and lives towards oneself through the act of feeling?

3. Is it possible in principle to apply such characteristics related to traditional psychological tools (objects and signs), developed within CHP framework, to digital means, through which virtual reality (VR) is created? Are the ways of human action described in CHP applicable to the course of human action in VR? In this case, we must assume that VR is arranged in the same way as the original social, physical, material reality where humans initially operate. Is it so?

Digital chasm

The younger generation, especially schoolchildren have been living in a digital environment, which is now their habitat, for a long time, since birth. Such presence in the digital environment truly deforms the behavioral structures of children and adolescents. In this situation, the following happens. With the massive introduction of smart digitals into the everyday life and immersion of children and teenagers in the virtual environment, a smart gadget and a child change places: a gadget takes on the active role of the "subject" that affects an individual, and a schooler assumes the passive role of the subordinate "object". This is due to the fact that a smart gadget already has a script of behavior, an algorithm of action. Picking up a gadget, a child with unformed abilities, who has not yet mastered one's behavior, does not simply take a gadget in one's hands. A child obeys the script of behavior wired in a gadget.

We call this phenomenon the *digital chasm*. It means splitting up the basic scheme of adult-child communication, due to which an *adult leaves the child's event field*. Adults are absent in the children's virtual world. On the other hand, smart digital, i.e., digital twins in VR, acting as quasi-mediators, taking up the function of an action pattern, are presented in the form of a ready action, intended to be taken and repeated, bypassing the stage of mediation associated with a child's personal effort. As a result, a child does not live through the very act of mastering one's behavior, does not perform the action of mediation, and therefore does not become the subject of action, since this is not required. Rather, the action is required according to the pattern, the script wired into the gadget.

Thus, both semantic and functional replacement occurs. VR replaces the original, socio-cultural reality, where the act of mediation and mastery took place. Due to the replacement, a child, being torn away from a living adult who has replaced oneself with a gadget, creates a situation of immersion in VR. The initial situation, which is based on a keen desire to see, hear, feel the living world, is translated by a child into VR, but in a *converted form*, it is embodied in the act of immersion and replacement, because it seems to a child (a child wants) that there, in VR, (s)he will find everything — fullness, meaning, an enduring source, and the joy of meeting and accepting⁶. But at best, a child receives a virtual substitute, a copy of the withdrawn original (person, thing, action, image) (Fig. 1).

⁵ B. Elkonin notes: "Feeling of oneself — this initial form of self-determination and identity — is the deepest existential psychosomatic foundation of human existence and, in particular, the initial condition for the situation of achievement. It is essential that the feeling of oneself as a "primary need" is not a natural given; it is built as a function of a certain type of effort. The type of effort, when the feeling of self establishes, presupposes mediation in its entirety, namely, the strengthening, reflection and return of one's latent, internal "aspirations" to an individual" [15, p. 157].

⁶ See detailed representation of virtual reality as a converted form [13].

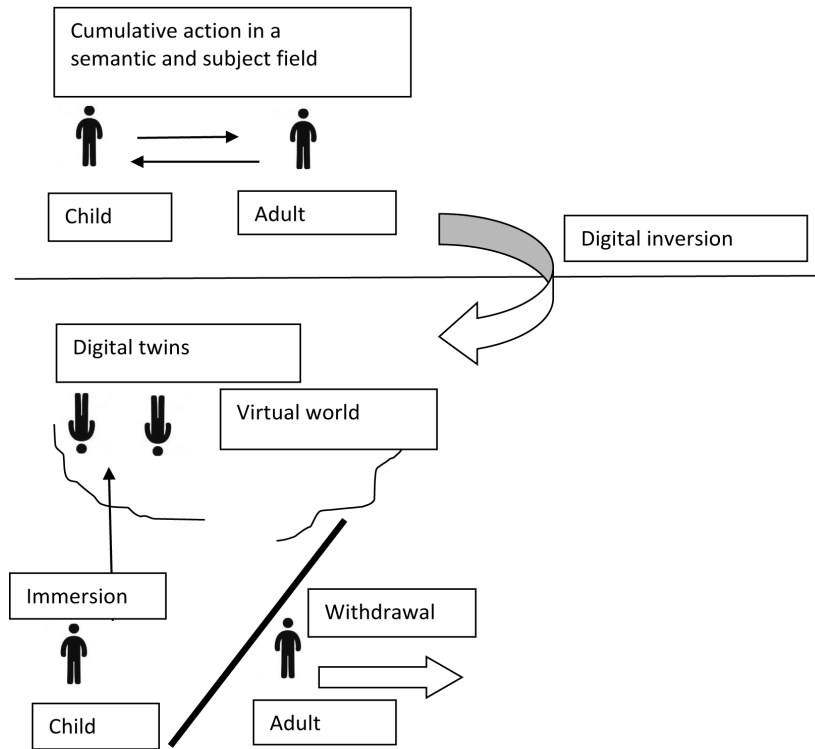


Fig. 1. Digital chasm and replacement

In view of the above, we observe a whole range of consequences of the digital chasm. These consequences are as follows. Let us describe such situation as the fundamental, model one, realizing that variations are possible within its limits.

Functional inversion

A gadget has built-in action scripts that guide a child. The latter does not act, but is led. In a living “cumulative action” (D. Elkonin) a child experiences and lives this joint action with an adult, to whom a child returns one’s mastered and meaningful, already appropriated, action, shows it to an adult, seeking confirmation and acceptance. In a situation of semantic loneliness alone with the digital, a child does not have this opportunity, and does not want to, because a child is attracted to oneself by the beautiful world of digital temptations.

In a situation of development (in its norm), a child, in the presence of an adult, performs a mediated action to master one’s reactions with the help of signs – tools, as a social situation does not prompt a child: if we take the situation of a child’s relationship with an adult in the norm, if an adult does not give any clues. Instead, while in VR, a child immediately receives not just a hint, but a whole navigation of actions, wired into a gadget. The whole scheme of behavior is built in the logic of temptation rather than in the logic of mastering one’s behavior: click a button – get a bonus. With such a scheme, the highest ability cannot be formed, since the most important thing does not happen – mediation

of behavior by a tool and mastery of oneself, one’s reaction. There is no need to perform the action of mediation, exert oneself, as long as you immediately receive a bonus.

The problem is not replacement of one tool with another – a pencil and a pen for a gadget. The problem is that the tool itself (gadget) is fundamentally different. It *takes away the cultural function of the subject* from a child, and acts and works instead of a child. An artificial product, a technical device, and not a person, becomes active: the functional inversion occurs.

Event shifting

Multiple studies show that children are not just present on the Internet and spend many hours there. They live there. They live in the virtual reality. The problem here is not the digital or remaining in the virtual reality. When a child is immersed in VR the *value emphasis shifts* in favor of the virtual reality. A child experiences actions in VR as more valuable. What happens to a child (in fact, to one’s digital twin in VR) is more significant for a child than what happens here, in the social reality. The *event center is transferred* from this – the real world to that – the virtual world.

An adult mediator (a cultured adult), who previously created the situation of growing up in the norm of ontology, building up the mediation action, is simply absent in VR. Instead, digital twins and virtual interlocutors are presented to a child, luring the latter further and further into the depths of the virtual forest.

Scenario capture

Prior to the digital, adults as cultural mediators used to offer a behavioral scenario to children [16]. Furthermore, a repertoire of different scenarios unfolded for a child in a real social environment, with scripts marked as priority and non-priority.

Therefore, mediation of a children's behavior has always been immersed in the scenario context, presented to a child. The sphere of mediation would perform according to a particular scenario context.

And now children enter the virtual world of temptations. The latter has radically changed specifically the scenario context. Previously, this context was somehow distant from the tool-sign, from an individual line of behavior, albeit related to it. Now a script, and what's more — a priority script is already embedded into a device, a gadget, a mobile phone, a tablet, into a game on the Internet. To be more precise, the scenario context actually shrinks, since adults are removed from this context as carriers. Instead, there is an almost complete replacement of the social reality with a dominant scenario, embedded into the main intermediary — a smart gadget.

Before gadgets, a child each time performed a new action in a new situation, overcoming the difficulties and solving new tasks to fulfill an objective action. With a gadget, a child gets a ready-made behavior script, and instead of a new action in a new situation, (s)he repeats a ready-made script, embedded in a gadget.

Thus, a child does not experience the act of development, since (s)he does not carry out a real action of mediation associated with mastering one's behavior. There is nothing to overcome. Therefore, there are no reasons to form one's own subjectivity.

Semantic horizon flattening

D. Elkonin noticed that there is a certain development lag of the motivational-need sphere behind the operational-and-technical sphere in ontogenesis [16, p. 390]. A combined adult-child action, however, is the unity of affect and intellect. Affect is associated with orientation towards another person, and here social meaning is generated. Intelligence is associated with orientation towards a real object, the conditions for executing an objective action [16, p. 403].

When an adult is replaced with a gadget, it brings radical rearrangements. The whole semantic, motivational-and-need sphere curtails and is replaced with a ready-made way of action, coming from a scenario context, embedded in a gadget. Such pattern copying does not imply any cooperative action.

If a gadget takes the place of an adult, then the motivational side of an action disappears, and the meaning disappears. All that remains is the objective, operational and technical side of an objective action, in a contracted, reduced digital form, which a child does not master, but takes in the form of a ready-made sample scheme from a

gadget, in the form of an algorithm, without being able to build joint activities with an adult.

Social vs virtual: changing places

A gadget with an embedded function and a behavior script is not a carrier of a social function. It offers the virtual rather than the real world — a world of converted forms. Therefore, if a child takes it as a model and embeds it into one's behavior according to the internalization pattern, then a child imitates the virtual and not the social world. So, a child becomes a virtual but not a social being; more precisely, a child replaces oneself with one's digital avatar. It is, therefore, the virtual, not social internalization that takes place.

Effort vs convenience, comfort

Lev Vygotsky started out with the Marx's model of work efforts, built as an external activity with a tool directed outwards to transform an object, the nature. In contrast, Vygotsky constructed a model of internal, psychological activity, where the key role is played by a psychological tool, a sign directed inwards, for a person to master one's reactions and transform one's own behavior. It distinguishes psychological tools from technical ones: orientation inwards rather than outwards.

Historically, the development of technology followed the logic of the first model, the logic of improving external tools, technical devices in terms of increasing their effectiveness as well as convenience and comfort for the users, individuals. Humans adapted and developed tools, making them more and more convenient, efficient and smart so a tool became a smart machine. All sorts of ergonomic developments, etc., are associated with it. At the same time, in the man-technology relationship the functionality has been distributed more and more towards the machine to make it convenient for human users who were able to easily master technical devices. Smart technology is mastered according to the principle of a self-instruction manual, wired into technological devices, by pressing a number of buttons, and the machine already works by itself, regulates its own work. The program for its functioning is wired into a technical device. Humans do not need to master it; they prefer to simply use it. In a nutshell, there is no need for a housewife to get into the principles of a smart washing machine. Press the button, and it does the work you require. Thus, humans have been transferring more and more various functions to a tool, a machine, turning it into a smart technical device.

Such functional outsourcing has gradually delivered. It was important for humans that tools became increasingly smart and efficient machines. Such qualities as efficiency, convenience, functionality have always been the basic requirements for technical devices in terms of work efforts. For technology, it is the norm. This is how all technological progress was built up.

The psychological tool-sign, directed inwards to transform human behavior, however, should not be considered in the same categories — convenience, ease of learning and efficiency. The principles of convenience and efficiency applied to work efforts are adequate, but applying the same principles to a psychological tool in child training and development hinders the child performance. Man — technology relationship is reversed here: on the contrary, convenience, efficiency and outsourcing cannot be the main criteria regarding training. The most important is to create zones of proximal development for a child, generate the situations for development through overcoming that require personal efforts. It should be difficult so that a learner would be able to master one's reactions and construct oneself through this.

With gadgets, the opposite happened. They have entered children's everyday life and changed everything. They are convenient, easy to learn and effective. When gadgets began to replace Textbook and Teacher, Parent and Mentor, when learners began to more and more obey a convenient interface that a preschooler masters at once, then an inversion sprang up: instead of putting an effort, one just needs to grasp and use a convenient and safe gadget. Gadgets are convenient, effective, and quickly mastered; they replace an adult and create the illusion of development.

Then, the main condition of cultural development is not met: humans cease to master their behavior. It is not required in communication with gadgets.

Safety illusion

In the mediation-mastery model an adult shows an exemplar to a child, manifesting oneself as such, a living carrier of an exemplar, thereby building motivation for a child, who, despite a new situation, is ready to take risks. Learning a new action with an object is always risky. Taking the first steps, you fall and hurt the knees. Nevertheless, you try, even if it is painful. But there is an adult nearby who will always help. In the presence and inner participation and assistance by an adult, a child is ready to take risks — perform a participatory action.

In the gadget-and-digit case, you risk nothing. Gadget developers have done everything, so you do not need to put any efforts; they have made it comfortable and painless. You press the keys with your fingers. And you don't get hurt if something goes wrong. You try again, and again it doesn't hurt. You do not receive a response from gadgets in the form of an explicit physical contact. Instead, you get bright, alluring, and seductive pictures and the comfort of a digital journey, but "as if" you are present in the absence. You do not experience the fullness of accomplishing your own action and the feeling of connectedness with the Other (an adult who supports you here). But it is not required.

Thus, the digital, being a VR unit, cannot be felt and lived through in the same way as a thing, object, word,

or sign is experienced in the act of mastering, becoming a means of action of the subject. It does not and cannot, by its very nature, give a sense of self-presence and participatory action. The digital has already been given to the subject of action in the form of ready-made pictures, images, and action scenarios. The digital remains an external image, not felt deeply, not its own, it remains an external picture rather than an appropriated mode of action.

In this context, the digital being a VR unit, cannot in itself act as a means of mediation, if the situation of mastery is not built appropriately, artificially, if the situation of mastering the mode of action and mastering oneself, feeling the very method of mastering is not built artificially, experiencing oneself in the act of mastery. The simplest example is that you need a specially built model of a virtual simulator, for example, an airplane or car simulator. A simulator does not replace a real aircraft, but it can be used to train skills. Although it will still be an artificial situation that does not replace the reality (a simulator will never replace an airplane), nevertheless, a virtual model helps to safely master new ways of acting in the complexly organized reality.

After all, what is important? The psyche is simply not accessed in its pure nature, it is always represented indirectly through texts, stimuli, means, devices, tools ... As B. Elkonin states, Lev Vygotsky reversed this negative connotation and turned it into a positive line of reasoning. This means that the very act of mediation and mastery must be made visible that lived through by the subject. Psychological tools, means, things and signs must be built into the act of mediation, in which the psyche itself begins to be seen, formed, and molded. B. Elkonin resorts to the concept of constructing a "trial-search action". The latter is properly constructed, it is not automatically presented, does not exist as a ready-made action and is not performed automatically, and it is stimulus-reactive [15, p. 152–161].

In this case, rather than talking about the digital as such and VR, we should discuss what it means to build a trial-search action, but already in a hybrid environment, with the help of the digital? And how can the digital be used to construct a search situation for development? When we ask ourselves questions like this, we must remember that the problem is not the digital. We express ourselves incorrectly in our speech patterns. As previously, before the digital, the question was not about what is the sign per se. Without constructing a situation of child — adult mediation, the sign cannot be such a means. It is nothing in itself, an empty grapheme, a form. Therefore, the digital cannot act as a means of mediation in itself, but only in the hands of an intelligent adult. It is generally neutral and ambivalent in relation to the subject of action. But it begins to "speak" and come to life only in a situation of constructing a trial-search action.

We are forced to admit that no model of mediation has been constructed and described so far that would include the digital as a new type of cultural mediator. There are only different assertions. A number of authors indeed insist that the model of mediation, which is the core in CHP, must be and can be used in a new situation of development, and the digital must be included in this model. Other authors state that the digital has already become a new mediator and we are witnessing digital socialization, and such new phenomena as digital childhood, digital education, digital development, etc. are established. Children immersed in VR, lose themselves and the entire social world, but it is a coerced choice: they actually lose the necessary socio-cultural supports and guidelines that children previously used to obtain from cultural intermediaries, adults. Unable to find them, they plunge into VR and find there converted kind of such supports in the form of digital twins, avatars, or replacements.

In view of the above-described situation, we must note that the digital itself cannot be a ready-made means of mediation⁷. It is necessary to build situations of mediation in a special way that include the digital and construct such a field of adult – child interaction where they can build up a joint, cumulative action, but with the help of the digital. This is a fundamentally new task for adults, primarily because the digital, according to its root task, initially acted as a replacement for the “analog”, the physical, material world where the human is born. The second point: the digital is more than a technology. It can be used as a means, but it also serves as a characteristic of the human environment. The task for CHP – the need to build up an act of development involving the digital (in its entirety – as a unity of mediation and mastery) – is faced with the fact that the digital (digital technologies) simultaneously act as a means of creating a new, digital reality (VR, in which children plunge using immersive media) and as a characteristic of this new habitat. The digital is more than a tool and a sign; it is a way of living in the new hybrid environment.

They live in the digital. But most importantly, getting into this environment is different than in the case of the first, social world. A child is immersed in the digital world, all without effort. It's like plunging in water. The digital world is accessible and open; one can get into it instantly, in a couple of clicks. The rules of immersion in the digital world are simple, they are accessible even to a small child, the easiest tutorials are wired into smartphones and gadgets, navigation is simplified, and, with some easy gadget manipulations, children enter the world of temptations and things – that are inaccessible

and prohibited in the first world – merely in the form of digital replacements. The act of development requires personal effort and the fullness of presence, but immersion in VR does not necessitate such effort, yet the illusion of presence is experienced. There is no need to go through the stages of mediation, VR immersion is safe. A child enters the world of converted forms, replacements are available for the real world, and an individual has an illusion of the fullness of living.

In this case, the task is to return a human to oneself, overcome alienation and deobjectify the converted forms. To this purpose, if we talk about the development of teaching at school with the help of the digital, it is necessary to build a fundamentally different model of teaching. It is precisely such a model of learning that is built up according to the logic of the algorithm, according to the model of the disciplinary matrix, question-answer learning, that does not stand the test of the digital. Algorithmization, i.e., digitalization, begins before the digital. It means that the dependence on the digital must be overcome prior to the digital, building up an appropriate learning model in the classroom.

The digital at the classroom: the search situation

What learning models do we develop and implement in the mainstream school using the digital? The mainstream school as an institution is established as a social machine. Thanks to M. Foucault, the school, along with the clinic and prison, has long been a disciplinary institution of supervision and punishment, in which a person (teacher and student) acts as a subordinate individual, and not as a personality and subject of development. This is because in the conveyor model that dominates the mainstream school, learners can be nothing but a passive function. It stems from programming the behavior of students and teachers, which is the basic process when school is built on the disciplinary matrix model. The principle of behavior algorithmization is already embedded in school, organized according to the conveyor model. Digitalization simply adds to and technically consolidates such algorithmization.

Introduced widely, the smart digital inevitably brings us back to the old behavioral schemes of conduct, when learners are viewed as reactive, passive beings, acting according to the stimulus-response pattern. Researchers point out that the mainstream education returns to associationism and behaviorism, which, it would seem, have long been overcome in the Russian psychological

⁷ O. Rubtsova notes that in the CHP studies no one has raised the issue of the digital per se that mediates activity [9, p. 121]. I must admit that the digital cannot be such – a means – on its own. The reason is simple: it is not a subject. It can be a means of mediating action in the hands of an individual that may be ambivalent: either for good or for evil. Therefore, rather than discussing the digital we should focus on VR and human actions in it.

and pedagogical thought. But digitalization has revived them [5, p. 41].

We believe that one of the answers to this challenge is the development of such learning models where a schooler is considered a subject of development, overcoming stimulus-reactive behavior. We consider the cultural-historical approach elaborated in the Vygotsky tradition [5; 6; 12] as the methodological basis for such models. Instead of a simplified digital-algorithmic approach, the authors of the School of the Future project propose a digital-cognitive approach, rooted in the cultural-historical concept [5; 6].

The key criterion for the adequacy and effectiveness of using the digital at school should be the position a student takes on when learning with the help of the digital: whether a student acts as a passive object of influence, performing tasks according to a given algorithm, or a teacher creates a *search situation of development* when a student's *subject position* is formed? The digital, like any other tool, must be built primarily into the situation of learning and development, *associated with the formation of a student's subjective position*. In this case, the *criterion for evaluating* the use of ready-made digital technologies and the development of new ones should be whether using the digital contributes to the construction of situations of learning and development and the formation of a student's subject position or not.

It has long been proven that student's subjective qualities are formed in the mode of problem-based search learning. Only such a mode makes it possible to overcome the paradigm of algorithmic learning, which dominates the mainstream school and provokes a student to the stimulus-reactive behavior.

Digitization in the manner of algorithmization does not simply begin with technical devices and gadgets, but is triggered by programming student behavior. It is necessary to construct search situations and then embed digital technologies in them to help teachers motivate students for the cognitive search activity.

If, however, a search problem situation is not created in the class, if the lesson is for the most part built according to the "question – ready answer" algorithm, then with such a scheme, the digital will not only fail to contribute to student's development, but will also provoke an even more algorithmic behavior. In this regard, teachers must understand whether they create a search situation for learning/development and what place the digital occupies in this situation.

A search situation unfolds in several stages. At each stage a teacher decides whether to include (or not include) the digital in teaching. A teacher decides at what stage this inclusion is not required, and at what stage the inclusion of the digital in the process is not only justified, but also desirable, and the digital will be an indispensable smart assistant. Let's outline these steps.

1. *Challenge*. Motivation. Presenting a task to students, for the solution of which they do not have ready-made means, knowledge and experience. Creating a problem situation related to a cognitive or real-life problem. Problem formulation. Setting the goals and objectives aimed at solving the problem.

Possible role for the digital: a tool for demonstrating, for creating a provocative situation (pictures, videos, illustrations, examples, etc.).

2. *Sense-making*. Collective or individual updating of knowledge, students identifying a lack of knowledge to solve a problem situation, to complete an assignment.

Possible role for the digital: use of digital educational platforms for online conferences, if necessary and technically possible.

3. *Search – inquiry*. Asking questions, collective search in the class, searching for information, working with textbooks, reference books, information on the Internet, conducting experiments (the choice depends on age, the subject of a lesson, the complexity of a problem).

Possible role for the digital: the use of gadgets and digital educational platforms as navigators for information search.

4. *Discussions*. Work in small groups or in pairs. Students share their solutions, discuss solutions, check, compare, evaluate and correct, correlate their activities with others.

Possible role for the digital: a digital educational platform for online conferencing.

5. *Reflection*. Evaluating what is achieved, establishing a rule, a concept, patterns and new knowledge. Students are looking for a common solution to particular problem situations, they offer an algorithm of actions, they check it, edit, and build up a certain model together with a teacher. Most often, students go through this stage with the help of a teacher, who uses leading questions, find the desired rule, derive regularity, and formulate a concept.

Possible role for the digital: using the digital (appropriate programs, for example, Miro) to assemble a constructor of the acquired knowledge and representations, assembling a configurator (or cluster) of knowledge.

6. *Knowledge formation and reinforcement*. The results of the search and their comprehension and discussion are presented. Formation of knowledge, picture, vision. Verifying knowledge. This stage is final and constitutes some kind of test work (quiz, test, exam, mutual quiz, self-examination, etc.). Based on its results, a teacher and a student by oneself conclude that the search situation has been successfully completed, the student has learned the necessary material and is able to deal with problematic situations; the student develops a subjective position.

Possible role for the digital: a virtual simulator used for training, consolidating the acquired knowledge, rules, concepts with specific examples.

Conclusion

We believe that the challenge faced by cultural-historical psychology in the situation of digitalization is primarily due to the fact that there is some oblivion of spiritual tradition, the mainstream school and the average family have “lost the human”, ceasing to treat themselves as subjects of care. In this situation digital technologies

have acted as a provoking factor, because in the absence of concern for oneself as a subject of development, the virtual world created by the humans themselves with the help of the digital becomes a seductive substitute for the first world, the human world. In this regard, we all need to return ourselves to ourselves, restore the practices of development and formation of our own subjectivity, however, involving the digital as a smart assistant.

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Risks and intrigue of “digitalization”. Afterword to the articles by Gromyko and Smirnov

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As part of the reflection on the articles of Yu.V. Gromyko and S.A. Smirnov, the risks and opportunities of the “digitalization” of learning are considered. Risks are related to the “absorption” of subjective forms of activity in computer programs. Opportunities are in the construction of programs that initiate not only following algorithms, but also their trial and error correction.

Keywords: the element of «digitalization», the ontology of psychology, the way of the presence of an adult (teacher, parent), trial-and-error action.

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Риски и интрига «цифровизации». Послесловие к статьям Ю.В. Громыко и С.А. Смирнова

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В рамках осмысления статей Ю.В. Громыко и С.А. Смирнова, рассматриваются риски и возможности «цифровизации» обучения. Риски связаны с «поглощением» в компьютерных программах субъектных форм активности. Возможности выступают в построении программ, инициирующих не лишь следование алгоритмам, а их пробно-испытательное изменение.

Ключевые слова: стихия «цифровизации», онтология психологии, способ присутствия взрослого (педагога, родителя), пробно-поисково-испытательное действие.

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Both Gromyko's article and Smirnov's are devoted to an urgent, topical theme and concern — the concern for ways of maintaining human subjectivity in the spontaneous and massive growth of digitalization, which encompasses and absorbs educational acts.

I can cite a case I observed as an example-symbol of this absorption. A young mother is carrying her baby, who is about a year old, in a stroller. She is talking on her cell phone, and the child doesn't disturb her because she is busy watching what is happening on the tablet in

front of her. Is it possible to say that here the child is watching, looking at what is happening on the tablet? I believe that it cannot. It is not the child that looks at what is happening on the tablet, but the tablet device that moves the child's eyes — his eye movements are reactive, automatically controlled from the outside. The tablet does not work with the child, but instead of the child. Y.A. Gromyko and S.A. Smirnov argue that in the element of digitalization something similar happens to older children (and I would add that often to adults as well). V. Gromyko writes that the computer "takes away" the adult from the child, while S.A. Smirnov speaks of "digital rifts" between the child and the adult.

A note here is appropriate. What "adult" is meant? More precisely, what kind of adult presence is implied? Is it, for example, an adult (parent, educator) who is involved only in his or her own power-associated attitudes — his or her "Super Ego" — in the child's limitations? If yes, then the "rupture" of their relationship is only a replacement of one kind of child reactivity with another. The way in which the adult addresses the child is not a given, but is sought precisely in the task of constructing an act of mediation. And this is not a private "technical-methodological" consideration, but an ontological principle that sets the conditions of co-communion of adult and child — Co-Being in the construction of the Act.

Y.V. Gromyko proposes a way of introducing "numbers" into teaching ("cognitive-digital approach" in teaching), based on interesting developments by P.O. Skobelev. These developments build a computer simulation of teacher-student interaction. Most likely, there are also the results of applying these developments in teaching, i.e., data on the effects of their experimental testing; but, apparently, these data are presented in other articles. S.A. Smirnov proposes general principles for introducing the "digital" beginning to learning.

S.A. Smirnov relies on the cultural-historical concept of L.S. Vygotsky and its continuation in the works on the conditions and effects of mediation. Here he singles out the "sense of own activity" in the construction of action as the key condition and argues that this is what is lost when a child is involved in the "digital element".

V. Gromyko also relies on the works of L.S. Vygotsky, but at the same time treats them critically, arguing that the reference to "mental functions" coming from W. Wundt and others is insufficient for the construction of educational systems in their essence. One cannot but agree with this assertion, but with one important clarification. L.S. Vygotsky spoke not about "individual" mental functions, but about "psychological systems" — bundles of functions initiated in the act of mediation. And in the latter period of his work, in works on child psychology, he spoke about a systemic and semantic structure of consciousness. And now this assumption can be understood as an indication that, according to Vygotsky, the psychological system is

constructed in the retention or reconstruction of the Field of Meaning activity. I would venture to argue that it is here, in the construction and reconstruction of the Field of Meaning, that the origin of what Gromyko calls "mastery of activity" is revealed. Otherwise, the mere use of the word "activity" in no way indicates what a person masters and how he masters it.

Referring to the works of V.V. V. Gromyko proposes to speak not about mental functions, but about abilities, which does not cause objections if "ability" is thought exactly as mastering of a way of action. There remains, however, the question of the manifestation of such mastering. The manifestation of ability is not simply the fact of correct performance of a certain class of tasks.

Reading Vygotsky's work *Thinking and Speech*, Yu.V. Gromyko, following V.V. Gromyko, following Davidov, discovers the "rudiments" of activity theory. But not the theories of A.N. Leontiev and S.L. Rubinstein, but G.P. Shchedrovitsky's conception of thinking (see Figs. 2 and 3). The intrigue of G.P. Shchedrovitsky's scheme is in the "connection" of "pure thinking" and action in communication, which is built up as the exposure of the sign's (apparently, scheme's) meaning — the understanding of the signifier. In communication comprehension there are reflexive positions through which thinking and acting are connected.

V. Gromyko further argues that the "ontology of psychology" is set by the scheme — the language of thinking, while "concrete" research may be carried out in the languages of psychological functions, communication, and states of consciousness. BUT! It is necessary to somehow connect these several languages of research with the basic "ontological" scheme! Otherwise we will have "multilingualism" without mutual "translation" (which, by the way, is the case with many modern psychological conceptions). So it is the scheme of thought-activity that claims to bind, to correlate different languages of psychological research? It is doubtful, since the scheme itself only claims that reflexion and comprehension connect thought and action, but does not raise the issue of the conditions of construction of the very "knots" that connect reflexion and comprehension. No attention is paid to the question of constructing a way of their presence in fullness. Yet, it is a question of those conditions under which thinking becomes the way to mediate action, i.e., the fulcrum securing the action and keeping it in place. References to reflexion and understanding in the presumption of immediate truthfulness-understanding of this very reference are nothing but a withdrawal from the key question. This is because the scheme of thinking activity is believed to be the scheme for both considering and constructing a certain behavior. But it is assumed without investigating and revealing the transition from the language of consideration to the language of construction. These are typical classical scientific concepts.

In conclusion, I would like to draw the attention of both authors to interesting and important precedents for the construction of "children's" computer programs. For example, in MGPU a master's thesis was defended, in which the plot of a fairy tale was recreated on a tablet. At the same time, the computer program provided the opportunity to "manipulate" the image in different ways. There were children who manipulated the key event of a

fairy tale — they played, in the words of L.S. Vygotsky, not with its "plot", but with the "story".

Similar test-playing is possible in other, more "serious" programs. This is how a test of a mode of action can be constructed — a test of possibilities. "Smart" ways of "digitalizing" open up possibilities for trial-and-error forms of orientation. I think that this is how thinking comes out, is "exposed".

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Talented Children who Develop Digital Artifacts and Derive Strength from them: an Example from the Brazilian Metropolis Talent Project

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The present paper presents the Brazilian experience of the Metropolis Talent Program (PTM), which aims to develop the cultural talent of young people with high skills in the field of information technology and its interfaces, through scientific research, the expansion of creativity, innovation, and entrepreneurship. This project also aimed to create opportunities for the dissemination of new knowledge in both developmental psychology and education, as well as to explore professional career possibilities related to the field of gifted individuals, by offering a context that facilitates development through creative insertion in the world of work and social solidarity participation. The program's actions have been contributing to ensuring the existence of mechanisms that allow the full attendance of the special educational needs of these young people, as intended by the Brazilian Law number 9,394, December 20, 1996.

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Талантливые дети, разрабатывающие цифровые артефакты и черпающие в них силы: пример из бразильского проекта Talento Metropole Project

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В настоящей статье представлен бразильский опыт программы Talento Metropole Program (PTM), целью которой является развитие культурных талантов молодых людей с высокими навыками в области информационных технологий и их интерфейсов посредством научных исследований, расширения творчества, инноваций и предпринимательства. Этот проект также был направлен на создание возможностей для распространения новых знаний, как в области психологии развития, так и в области образования, а также для изучения возможностей профессиональной карьеры, связанных с проблемой одаренности людей, поскольку содержит контекст, облегчающий развитие через творческое погружение в мир труда и социального солидарного участия. Реализация программы способствует обеспечению механизмов, позволяющих в полной мере удовлетворять особые образовательные потребности этих молодых людей, как это предусмотрено Законом Бразилии № 9 394 от 20 декабря 1996 года.

Ключевые слова: одаренность, развитая одаренность, развитие человека.

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1. Introduction: talents, giftedness, high abilities and so on

The Great Encyclopedia of Medicine, edited in Moscow by N.A. Semachko and published in 1929, bears, in columns 612 to 414 of Volume VI, the entry ‘Genius’, written by L.Vigotski. In it, the author points out that if heredity makes genius possible, only the social dimension enables realizing this potential. The discoveries and genius creations result from a historical process, tangential to the culture of a certain era. Quoting Beitov, L. Vigotski states that talents arise everywhere

and always, as long as social conditions are favorable to their development. It concludes, therefore, that genius represents a qualitatively distinct type of development, resulting from the co-genesis of biological, psychological, and social aspects, still far from being understood by science [1; 2]. Approximately one hundred years after this publication, science continues to seek explanations that enable the understanding of the phenomenon of high abilities, here called giftedness, and the relations between this and cultural talent.

D. Dai & F. Chen [3] have identified “the gifted-child paradigm,” which has dominated the thinking of scholars

and practitioners in gifted education since the field's advent. For these authors, "paradigms" in gifted education sometimes present themselves explicitly and other times implicitly in our practice, functional but not well articulated.

Three paradigms seek to reference the phenomenon of giftedness today. The first refers to a conception of the phenomenon as strictly associated with biological inheritance. This definition of giftedness can be exemplified by the model advanced by Lewis Terman, an author who considers giftedness something inherited by a restricted portion of the population, the "1% higher level in general intellectual capacity, measured by the Stanford-Binet Intelligence Scale or by a similar instrument" [4, p. 43]. In definitions based on the domain-general model, or whether it is gifted or not since individual talent exists as a gift (from the English gift, to which the term "gifted" is associated, loosely translated as "gifted", "gifted"). Early definitions also discussed profile heredity, investigating the genetic components responsible for exceptional performance [5].

The second paradigm rejects the biological dimension and considers the phenomenon of giftedness as intrinsically psychological. Intelligence is associated with other dimensions, such as creativity and motivation [3]. It is noteworthy the change of emphasis in relation to the paradigm previously mentioned, the transposition of biological/genetic etiology to psychological/personality traits, but still individual. Both paradigms separate the subject from the social and cultural dimensions. The third paradigm considers endowment as a phenomenon founded on social aspects of development, emphasizing the role of contextual factors, such as social support or conditions of practice [3].

We propose that historical-cultural psychology represents a fourth paradigm in the theoretical approach to the bases of giftedness. This paradigm advances by proposing the social and cultural role in a dialectical, cogenetic process of formation of the phenomenon of endowment (and giftedness) in the psychological subject. In this direction, the focus should not be existential ("*Is this student gifted?*") but should rather be educational ("*What form (s) of instruction are appropriate for this student at this time?*") [6].

Despite all scientific contributions, this theoretical debate concerning the very nature of giftedness persists, mixing empirically-based data, myths, and common sense. This heterogeneous blend of stereotypes and prejudicial notions about intelligence, giftedness, and human talents keeps representing a challenge for psychology, education, and other inquiry domains. Ironically, one of the biggest annoyances in the domain of high skills/giftedness is the construct's definition. A central question remains: *When we discuss high skills, giftedness, high abilities, and talent are we referring to the same construct?* Unlike the status quo in other conceptual domains, there is no lack of terms and definitions here, where the non-consensual variety is disconcerting, as stated by L. Cross & T. Coleman [7]. For many researchers, the terms are used interchangeably, causing terminological and conceptual confusion. Consequently, concepts become vague with numerous and different definitions. One of the main reasons we try to define concepts is to clarify what we understand and, in this way, to identify and evaluate phenomena. These conceptualizing efforts, here and in other domains, face two

opposite risks: first, we risk being generic, and therefore describing something else; on the other hand, if we are very specific, we risk getting rid of important variables, creating inaccuracy. Therefore, in dealing with high abilities in psychology and education, it is essential to choose a theory of development and carefully build up the concepts with which it is intended to work [8].

The contribution of psychology to the understanding of human development trajectories has historically tended to two quite different positions: firstly, a biological framing, and secondly the emphasis on the accumulation of experiences and habits as the core of development. During such disputes, historical-cultural psychology presents a methodology for investigating human development and general laws that regulate this development [9].

For L. Vigotski, the development of higher psychological functions is configured as a central focus of psychological research, emphasizing the need to overcome dichotomous perspectives, which sometimes disregard natural, and sometimes social aspects. From the Vigotskian dialectic, it is necessary to consider two lines of development and the synthesis generated by their intertwining. Quoting this author, "the biological and the cultural – both in pathology and norm – have turned out to be heterogenous, distinctive, specific forms of development that do not co-exist next to each other or one above another and are not mechanically linked to each other, but instead are fused into a higher synthesis, complex, though still unified" [10, p. 26].

Based on the above, it is necessary to consider that the human constitution "is distinguished by unique special qualities and characteristics, specific to each individual, which, essentially, represent a variation of this average type of 'man in general'" [11, p. 283]. When he reflects on individual differences and inherited forms of behavior, L. Vigotski emphasizes "very clear and obvious deviations from personality concerning the general average" [11] or, in other words, the variation of intelligence in the upper and lower levels.

Such an inheritance, however, cannot be considered a destination; on the contrary, this potential does not take place in a vacuum; it is only realized in a social environment through the offer of tools and sociocultural mediations. L. Vigotski uses the concept of cultural talent to refer to the result of this intertwining. This was a radical argument with vast political and social implications for education, research, and politics, including the effort to conceptualize high skills, giftedness, high abilities, and talent. According to this theoretical framing, these categories might be considered in a multidimensional way to allow the advancement of the delimitation of terms to be used. It becomes possible, as a consequence, to consider an inherited potential. Still, the central aspect is its transformation based on social development mediation, which is situated, interaction-relational, and dynamic-systemic. Metropolitan Talent Project (TMP) considers a distinction between high abilities and talent, the first being associated with exceptional natural skills. In contrast, the second is associated with cultural tools, specific contexts of learning, and working activity, including interindividual cooperation. Such an epistemic turn was initially discussed by B. Gagné [12] and R. Subotnik & L. Jarvin [13].

2. The mediation of digital tools and technologies in human development

The development of digital technologies is among the upheavals experienced in recent years in the domains of material and immaterial culture. These, if we consider the Vygotskian concept of cultural mediation, present themselves as new tools of the human mind; they contribute to transforming the structure of higher mental functions, becoming an essential part of the mental system, and broaden the range of activities within which new psychological functions can operate [10]. Technological development has become a tool in human evolution and individual development and has transformed the human mind through digitally mediated socialization.

As proposed by M. Falikman [14], the phenomenon of human incorporation of digital tools can be described as extended cognition, characterized by the reconstruction of the system of higher mental functions through digitally mediated activity, since these tools provide extended access to information, going beyond cognitive support or scaffolding. However, it is noteworthy that digital devices and applications incorporate certain social practices like any other cultural artifact.

The proposition of a talent development program in the field of information technology has a link with the very core of this discussion, considering two interconnected aspects: on the one hand, the importance of the development of cultural talent for children with high skills and, on the other hand, the digital world that characterizes contemporary culture. Metropolis Talent Program aims to develop the interest of young talented people in scientific research and creativity in information technology and its interfaces. It also aims to create opportunities for the dissemination of new knowledge and explore professional career possibilities related to this field, with a view to creative insertion in the world of work and social solidarity participation.

3. TalentoMetrópole Project: a proposition for identifying and supporting the development of cultural talent in the technology of information contexts

Metropolis Talent Program (TMP) is an initiative linked to the Metropolis Digital Institute – IMD, a special unit of the Federal University of Rio Grande do Norte (UFRN), located in the state capital of Natal, in the north-east region of Brazil. It must be emphasized that this region has the country's lowest indicators of human development and quality of life. IMD develops projects towards training technical and graduate personnel, developing actions aiming to integrate the social and digital inclusion of young people from basic education to graduate school.

It is noteworthy that students with giftedness in Brazil are considered the target audience of special education efforts, as well as people with disabilities or global developmental disorders. Therefore, they have the right to the necessary specialized educational care to guarantee access to individualized and effective support measures, in environments that maximize their academic and social development, according to the goal of full inclusion.

As mentioned earlier, the conceptual characterization of giftedness can be described in four phases. The first phase comprehends the phenomena associated with high IQ. The second one broadens this conception and includes other individual characteristics, such as creativity and motivation. The third refines the concept and considers the social context in which the subject is inserted. Finally, the room breaks from the previous ones by shifting the focus from identification to talent development.

TMP is based on the Paradigm of Talent Development, from which the specific domain of Information Technology builds up experiences that allow cultivating talent and creativity, expanding the learning routes towards a solidary social insertion. The Program is less concerned with distinguishing those with an endowment from those not in this category. Above all, it is more concerned with better recognizing individuals who demonstrate distinct strengths and interests in IT and taking them as far as possible along a line of talent development. It assumes as central operational objectives: 1) to compose a diverse group of students served; 2) to accommodate the different trajectories and paths of talents; 3) to connect with 21st-century themes; and; 4) to contemplate the different personal interests and aspirations. To this end, it offers a range of additional educational resources, opportunities, and challenges for students differently from what is regularly offered in schools.

The model for developing cultural talent that underlies the TMP is proposed by R. Subotnik et al. [15], which provides relevant principles through which the potential is transformed into competence, competence in expertise, and eminence expertise. The first stage, called potential and circumscribed to childhood, is characterized by offering varied stimuli and a wide range of opportunities, with the central objective of increasing development and learning routes. At this stage, it is common for the child to be intensely involved with specific themes and activities of particular interest (hyperfocus).

The second stage, notably identified in the period of entry into formal education, is characterized by the movement to transform potential into competence. For this, formal learning, deliberate study, and practice in specific areas of socially recognized talents are vital. The third stage, characterized by the transition from competence to experience (expertise), typical of adolescents, requires surpassing the knowledge of the fundamentals of a specific domain. It implies movements that allow the initial socialization in the culture of a certain field of knowledge, which can be accomplished through cooperative work with other professionals, tutors, and other students. Finally, we highlight the transition from experience to eminence, which commonly occurs in adult life and is characterized by the original contribution and the reference that the individual assumes in a specific field of knowledge [15].

One of the strengths of the described model of talent development is the potential to offer opportunities and guidance that reach a broader range of young people, including those from families with low income, and opportunities for insertion in diverse cultural activities and linguistic environments. From the above, it is necessary to consider that the proposal of a talent development program depends on the link between young people and

universities and research centers, among other social devices [15].

The didactic sequence and the nature of the activities offered at TMP were elaborated based on the *Talent Development Model* [14] and the formative guidelines of the International Society for Technology in Education (ISTE). Four matrices guide the proposition of the three regular disciplines and complementary activities: Digital citizenship and collaboration; Research, information management, and communication; Critical, flexible, and innovative thinking and Problem solving and computational thinking. The overall structure of the TMP is shown in Table 1.

Students must prepare, together with their tutor each semester, an Activity Plan containing the schedule of studies and research projects to be developed. These plans must reflect their interests. Additionally, they carry out activities to develop social skills and creativity. Among these activities, *Talent Cine* (about movies), Art Club, and reading books stand out; the creation of a League to participate in scientific Olympics at the national level and monitored technical visits to laboratories, universities, research centers, and incubated companies in other cities areas are also programmed activities.

Currently, the TMP comprises 30 participants, aged between 12 and 24 years, coming from the last three years of Brazilian Elementary School, High School, and Under-Graduation. The process of identifying these young people is procedural and complex, involving four distinct stages, ranging from the training of teachers who assist in the identification of candidates for the program in schools to the dynamic of winter/summer courses where candidates are invited to face challenges in the context of technology of information. A transversal dimension in the proposition and proposition of the project as an academic initiative is the need for an expanded assessment of intelligence, motivation, creativity, and the skills and competencies that comprise them.

3. Final Remarks

The traditional conceptions of individual endowment refer to endogenous factors, considering subjects' greater

probability of success based on educational objectives or criteria. However, the effective educational system should not be attentive to the chances of someone standing out in school or the labor market but to the processes involved in the search for the full development of the potentialities of all participants. In a contemporary conception, the endowment cannot be disconnected from the curriculum, the mediation, and the cultural group where the talented individual is inserted. In this sense, it is argued that curricular strategies should optimize the learning of individuals with a particular profile of strength points, interests, and preferences. Subsequently, it is necessary to configure the curriculum so that it presents itself as challenging for the student and thus raises him to a new level of competencies, with pedagogical and technical support that provides the opportunity to develop talents to the level of excellence. Finally, it is necessary to provide students in such a program with a "community of practitioners" [16] in the context of which they can find identification, complementarity, and, therefore, an opportunity for development. In this way, the variety of trajectories and development paths is contemplated [5].

Brazil, like many other Latin-American countries, has a shortage of programs that aim to develop the talents of children and young people in general. There is also a lack of programs for individuals with high abilities. Seeking to contribute to minimizing this gap, Metropolis Talent Program aims to develop the cultural talent of young people with high skills in information technology and its interfaces, always aiming at innovation and entrepreneurship.

We propose here the use of the concept of situated learning developed by J. Lave & E. Wenger [16], for which learning is fundamentally a social and cultural process and not solely an individual process limited to the learners themselves. The authors mentioned above maintain that learning must be viewed as a situated, in-process activity. Learners participate in communities of practitioners, moving toward full participation in the sociocultural practices of a community.

The program aims to offer quality training that addresses the student's interests, considering their potential and bypassing the hierarchy and rigidity of traditional instructional curricula. The program has proposed to explore professional career possibilities related to this domain, with a view to creative insertion in the world

Table 1

Global Structure of Metropolis Talent Program

Timeline and thematic	Goals	Activities
<i>Semester 1.</i> The World of Technology: Yesterday, Today and Tomorrow	Presenting the IT domain, identifying the impact of current research, presenting different thematic areas to expand the horizons of knowledge	Students participate in workshops and lectures on different topics; technical visits to laboratories and research centers are provided; participation in round tables on contemporary themes are encouraged
<i>Semester 2.</i> Interdisciplinarity and Transversality in Information Technology	Verticalization of knowledge production and socialization in the IT field: IT interfaces with other areas of knowledge. The participant student is invited to develop ideas and solutions to real problems	Students participate in workshops and short courses on using specific IT tools and knowledge. They visit and interact with professors, researchers, and professionals from other areas of knowledge who develop projects in interface with ITs
<i>Semester 3.</i> IT Research, Innovation, and Entrepreneurship	Development of research, extension, innovation, and entrepreneurship projects	Students must select the laboratory and research project in which they will develop their activities. These can be carried out individually or in small groups, with the tutorship of a researcher professor

of work and solidary social participation. In the case of the TMP, we can highlight research and products aimed at helping to create productive processes, for example, tackling childhood cancer and mitigating the effects of the Covid-19 pandemic, through scientific and technological dissemination in public schools.

Finally, TMP has been trying to inspire new programs, fostering actions that transform the full potential of these children and young people into actions that guarantee a more egalitarian world with a better quality of life for all. This is important everywhere, and crucial in developing countries like Brazil.

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Adolescents' Experimenting with Roles in the context of L.S. Vygotsky's ideas: an Activity-Based Technology "Digital Storytelling Theater"

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The article is devoted to the elaboration of a new model of drama for adolescents – “Digital Storytelling Theater”. The model is based on the idea that the leading activity of adolescence is represented by experimenting with roles, in the framework of which adolescents acquire social roles as a new system of cultural signs. “Digital Storytelling Theater” allows to create conditions for adolescents' experimenting with social and psychological objects (roles, positions, relationships etc.) In this kind of drama adolescents do not only play out roles according to a given scenario but participate in a palette of activities while working on a performance. The elaborated model of drama activity allows to construct the zone of proximal development for adolescents due to two supplementary processes: interiorization and exteriorization. Interiorization is connected with adolescents' acquiring new cultural signs – various social roles and patterns of role behavior. Exteriorization presupposes revealing – “bringing out on the stage” – role contradictions and conflicts, which are profoundly linked with adolescent crisis and to a large extent determine the way how it occurs. The model was elaborated on the basis of the Center for Interdisciplinary research on Contemporary Childhood of MSUPE in 2019-2022 and was tested in 3 different schools in Moscow and in Moscow Region with the participation of 336 adolescents aged from 13 to 15 years.

Keywords: experimenting with roles, role, drama, theater activity, drama-based pedagogy, school theater, adolescents, zone of proximal development, Digital Storytelling Theater.

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Ролевое экспериментирование подростков в контексте идей Л.С. Выготского: деятельностная технология «Мультимедиа-театр»

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Статья посвящена разработке модели театральной деятельности для подростков – «Мультимедиа-театр». В основу модели положена идея о том, что ведущей деятельностью подросткового возраста является ролевое экспериментирование, в рамках которого подростки осваивают социальные роли как новую систему культурных знаков. «Мультимедиа-театр» создает условия для экспериментирования подростков с социальными и психологическими объектами (ролями, позициями, отношениями). Предполагается, что в таком театре подростки не только разыгрывают роли по предложенному сценарию, но и участвуют в комплексе деятельностей, связанных с подготовкой и реализацией

театральной постановки. Предложенная модель театральной деятельности позволяет строить зону ближайшего развития подростков за счет того, что она обеспечивает развертывание двух взаимодополняющих процессов: интериоризации и экстериоризации. Интериоризация связана с освоением подростками новых культурных знаков — различных социальных ролей и паттернов ролевого поведения. Экстериоризация предполагает вынесение вовне — «на сцену» — ролевых противоречий и конфликтов подростков, которые глубинным образом связаны с феноменом подросткового кризиса и во многом определяют то, как он протекает. Разработка модели осуществлялась на базе Центра междисциплинарных исследований современного детства МГППУ в 2019–2022 гг. Модель «Мультимедиа-театр» прошла апробацию на базе трех школ г. Москвы и Московской области при участии 336 подростков от 13 до 15 лет.

Ключевые слова: ролевое экспериментирование; роль; драма; театральной деятельности; педагогика, основанная на драме; школьный театр; подростки; зона ближайшего развития; мультимедиа-театр.

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A few words to the discussion about adolescents' leading activity

Today, the issue of spotting the leading activity of adolescence still remains one of the most discussed in the Cultural-Historical Theory. Many authors do not share D.B. Elkonin's "classical" point of view, that adolescents' leading activity is intimate and personal communication with peers. For example, N.N. Veresov argues, that communication may not be regarded as the leading activity in the strict sense of the word since in A.N. Leontiev's logics, the leading activity possesses a certain structure (tasks, actions, operations) which has never been described for communication [1]. K.N. Polivanova highlights, that D.B. Elkonin does not provide an "activity-based analysis" of adolescents' personal communication, leaving aside many questions connected with the content of development at this age period: "Unclear, concerning intimate and personal communication, remains also the issue of the mechanism of the transformation on the outer stage of the activity of communication (interpsychological form) into a certain personal ability (intrapyschological form) and, finally, the issue — which ability may be regarded a new formation of adolescence. Moreover, the question about the content of the intimate and personal communication remains unclear (we do not know what do adolescents communicate about)" [5, p. 14].

As an alternative for intimate and personal communication with peers are offered: socially significant (V.V. Davidov) and socially useful activity (D.I. Feldstein), socio-psychological experimenting (G.A. Tsukerman) and project activity (K.N. Polivanova. There is also a point of view that in relation to adolescence it is possible to discuss a number of different activities (V.P. Zinchenko, O.V. Lishin, B.G. Meshcheryakov).

From our point of view, the main reason, why the question of the leading activity of adolescence triggers discussions between researchers, relates to identifying the "ideal form of development" for this age period. As D.B. Elkonin argues himself, in order to fully determine a certain type of activity, which is specific of a particular age period, it is first of all necessary to identify "...its higher, developed form, which already exists as reality and active interaction with which constitutes the very process of development" [15, p. 403]. As we know, for elementary school period theoretical relation to reality was identified as an "ideal" form, (V.V. Davidov), however for adolescence this form has never been described [5]. At the same time, this form is discussed in L.S. Vygotsky's work "Concrete Human Psychology" [2], which, due to certain circumstances, has not gained necessary attention from his followers.

In his unfinished work, L.S. Vygotsky speaks about the necessity of studying in adolescence, *the structure and the hierarchy of the higher mental functions*: "The task in adolescents ... to study different spheres of behavior (professional complex etc.), the structure and hierarchy of functions, their relations, and collisions" [2, p. 1031]. In this very work Vygotsky argues, that the *hierarchy of functions depends on the social situation*, "...that is, functions change their hierarchy in different spheres of social life" [2, p. 1030]. As an example, L.S. Vygotsky points out to a judge who judges his wife. As a judge, he criticizes her wrong behavior (thinking prevails over passion), as her husband he continues to love her (passion prevails over thinking). In this case, the "drama" relates to the necessity of sentence: what would it be like? What function would prevail? By this very example L.S. Vygotsky highlights, that the relation of functions depends

on **roles**, which are characteristic of human in different social situations: “Social role (judge, doctor) determines the hierarchy of functions” – that is, roles act as *cultural signs, which regulate higher mental functions*. The collision of “functions = drama”, and “drama”, according to the founder of the Cultural-Historical Theory, is the main source of development.

Thus, while stressing the necessity to study in adolescence the structure and hierarchy of functions regulated by roles, L.S. Vygotsky points to the fact that the problem of the content of development in adolescence lies in the sphere of “role dramas”, which are connected with the introduction of the growing child into the system of social interactions. This point of view provides principally new possibilities for the analysis of the content of development in the transitional period, and particularly, for identifying the leading activity of this age period.

Thus, *the system of social roles*, which exists in the culture where the child is developing, may be regarded as the “ideal form” of adolescence. In this case “...interiorization of these roles determines the content of development in adolescence and takes place in the activity, which might be labeled as “role experimenting”. Role experimenting, in its turn, might be regarded not just as the leading activity of adolescence, but as a system of activities, which relate to “trying on” different social roles and types of role interactions” [9; 10].

Adolescents’ role experimenting as a socio-psychological phenomenon

At the beginning the concept of “role experimenting” was mostly used in the English-speaking scientific community for identifying the process of choosing virtual roles in video games, however, later the term broadened its meaning and started referring to any kind of playing out roles and images, which are performed both in real and virtual environments [10, p.27].

The term “role experimenting” is profoundly connected with the concept of *role*, which has long been neglected in Russian psychology. The main reason for this is still prevailing sociological understanding of the phenomenon of role, which reduces role exclusively to a socially determined pattern, which each human “acquires” for successful functioning in the society. This kind of reduction fully leaves aside *personal aspects of role*, and in its extreme forms equals roles to some kind of “masks”, which the individual “puts on” depending on the social situation.

This interpretation contradicts the point L.S. Vygotsky’s point of view. As it has already been pointed out, the founder of the CHT has clearly indicated the regulating functions of social roles as of cultural signs. While signs are interiorized, it is impossible to reduce role to some kind of a “mask”, which is imposed from the

outside. Moreover, it seems that Vygotsky regarded role as *a unity of personality and environment, where the unity of environmental and personal moments is reflected* (as an analogue of “perezhivaniye”). Thus, the social content of role is always inscribed in the socio-cultural context (outer plane), while its individual aspect relates to the personal characteristics of its bearer (inner plane). The social roles are never “played out” by the individual – they are always refracted through their personal characteristics and creatively “lived through”.

The sensitive period for acquiring the system of social roles as cultural signs is adolescence. It is exactly at this age period that the child acquires the possibility to regulate their behavior in different types of social interactions via roles. Apparently, adolescents need time and space for something which might be called “role test” – experimenting with roles and various patterns of role behavior. This fact is easily illustrated by various forms of adolescents’ activity, which, according to A.M. Prikhozhan, are literally “permeated by role experimenting” [8, p. 40]. In fact, almost all forms of interactions, in which adolescents are involved, are connected with testing of new social roles – whether it refers to creating virtual profiles (social networks or video games) or participating in different role movements/subcultures. These research-like, often play-like activities and interactions create space for adolescents’ development, since it is in these interactions that adolescents find a sense for their roles and roles become *personally meaningful* for them. Exactly “...as preschoolers eagerly get involved in a play situation for “playing out” the plots that they see in their everyday lives, adolescents seek space for experiment, however, in comparison with preschoolers, they are not that much interested in “playing out”, but rather in modeling of social relations and in constructing their “I-image” through this [9, p. 9]. From this point of view, the creation of *the zone of proximal development of adolescents* is connected with the construction of such spaces and platforms, where adolescents may creatively experiment with roles.

The idea of acquiring social roles as the result of the process of upbringing is reflected in the Federal Standard of School Education: in the framework of the realization of “The working Program of Upbringing”, the school is required to create conditions for “*the realization of the possibility of social tests*” [7, p. 20]. At the same time, despite the exclusive importance of role experimenting for adolescent development, the need of fulfilling the role tests is very rarely considered by the practice of contemporary Russian schools. Ignoring this age task contributes to the decrease of learning motivation in adolescents, it also decreases their level of involvement in the learning activity. Moreover, in school adolescents are often imposed with unwanted role patterns, which are capable not only of decreasing interest for the learn-

ing process, but also of triggering inner conflicts and contradictions. The lack of possibility to perform the role experiments in the learning process leads to adolescents' search for the means of solving their age task somewhere out of school. Searching for platforms for role experimenting often becomes the reason for adolescents' risky and deviant behavior (roofing, train surfing, train hop), including the desire to join some kind of subculture, desire to "escape" to virtual reality etc. [3; 10; 11; 16; 26; 28].

Considering all of the above, learning and development of adolescents might be efficient in the situation of *specifically organized joint activity, which allows adolescents to experiment with roles*. In the practice of school, platform of this kind might be organized through theatrical/drama activity, based on role experimenting.

Theatrical practices in education: Russian and international experience

In the last few years, theater and drama have been widely used all over the world for solving various tasks connected with development, learning and socialization of children and adolescents [17; 18; 19; 20; 22; 25; 27; 29]. The so-called "drama-based pedagogy" is widespread in foreign schools for teaching purposes, it focuses on learning through theatricalization of educational process, i.e., the use of both production directing and acting techniques as well as on approaches to teach subject content through role-playing, visualization, "hotseating" technique, "frozen pictures" technique ("tableaux"), pantomime, improvisation, storytelling, etc. Drama-based pedagogy encompasses numerous branches, including "drama in education", "developmental drama", "educational drama", "creative dramatics", "process drama", "role drama", etc. [23].

According to T.A. Poskakalova, in the European countries and countries of the English-speaking world the use of theatrical practices in education today is associated, first of all, with the idea of "sustainable development". Within the framework of this concept, the main goal of the educational process is not reduced to the acquisition of subject knowledge, but rather focuses on the development of students' personality, the formation of a holistic worldview, boosting their level of psychological well-being, and the acquisition of "21st century competencies" (soft skills, literacy skills). In this regard, most of the indicated areas of drama-based pedagogy focus at the process of dramatization itself as well as on the changes that occur in the process of joint activities. whereas the product of such activities (performance) is of secondary importance. A distinctive feature of drama-based pedagogy refers to the blurring of the boundaries between the stage and the audience – students simultaneously combine the roles of actors

and spectators ("actors" and "observers"), which contributes to the development of a wide range of skills and abilities (primarily reflective ones) [23]. As a result, in foreign pedagogy drama and theater are rarely regarded in the context of specific academic disciplines, but, on the contrary, are used as a means of integrating them. This explains the diversity of types and forms of theatrical activity that exist in the educational process abroad: being involved into theatrical activities, children and adolescents creatively reconsider themselves, revise and rethink the subject content they study, redefine the surrounding social realities and political problems [6; 13].

In Russia, the prospects for the use of theatrical activity in the educational process are announced/proclaimed at the highest level. Thus, according to the "Road map" of the implementation and development of school theaters in the constituent entities of the Russian Federation for 2021–2024, by 2024 at least 4 programs of extracurricular activities to support school theater are to be designed. Also, by that year the repertoire of school theaters should be revised and brought into line with the curricula. Moreover, educational and methodological centers for the development of school theaters in the constituent entities of the Russian Federation should be launched. New school theaters should be opened and measures should be taken to increase the number of children aged 8 to 17 years who are engaged in the "Art of the theater" educational programs [4].

However, today the use of theatrical activity in Russian education is non-systemic. Many teachers use theatrical activity in their teaching practice, but most of them do it intuitively, without having a clear idea neither about the specific ways of its implementation in working with different subject content, nor possessing adequate tools for assessing its effectiveness. It is also important to note that in Russia the educational potential of the school theater is most often considered in the context of familiarizing students with cultural heritage, primarily – with literary works or historical events. Partly for this reason, theatrical activity is practiced exclusively within the framework of the humanities and, in most cases, is fundamentally regarded as an extra curriculum activity [12; 13].

It is worth to mention that school theater in Russian has always focused on the final product, in other words, on the performance to be played in front of an external audience (other class students, teachers and parents), while the process of its preparation itself is considered as subsidiary. Moreover, it is always the teacher's prerogative to choose the plot, distribute roles and be in charge of performance and stage design [12]. Thus, theatrical activity in school practice most often comes down to students' passively acting out plots chosen and staged by the teacher. This position significantly reduces the developmental and educational

potential of the school theater, narrowing it to a reproductive educational technology. The current situation indicates the need to rethink the goals and the value of theatrical activity in the context of the educational process. It also demonstrates the importance of the elaborating special practical tools (teachers' manuals, recommendations, etc.) that would allow teachers to use various drama techniques and approaches to solve specific pedagogical issues.

“Digital Storytelling Theater” is an activity-based technology of learning and development of adolescents

The attempt to adapt a systematic approach to the application of theater activity as a means of learning and development of adolescents was undertaken by the researchers of the Moscow State University of Psychology and Education in 2019–2022. In the course of four years, the research group of the Center for Interdisciplinary Research on Contemporary Childhood under the guidance of O.V. Rubtsova conducted a series of experiments, in the framework of which an original model of organizing theater activity with adolescents was elaborated [12; 13; 14; 26].

In the concept of the model “Digital Storytelling Theater” drama is regarded as *a particular form of experimenting with social and psychological objects* (roles, positions and relationships). In this kind of theater, adolescents do not only act out or perform a given scenario, but rather are involved in a complex of activities connected with the preparation of a theater performance. An important constituent of theater activity is represented by the work with digital technologies, including shooting of short videos, which are later used in the performance. The elaborated model of theater activity allows to construct adolescents' ZPD due to the fact that it contributes to two complementary processes, *interiorization* and *exteriorization* (fig.1). Interiorization is connected with adolescents' acquiring of new cultural signs – various social roles and patterns of role behavior. Exteriorization presupposes taking into the outer – “on the stage” – adolescents' various role conflicts and contradictions, which are profoundly connected with the phenomenon of adolescent crisis and to a large extent determine the way how it unfolds. “Microdramas” and “pereghivaniya”, which emerge in the process of a particularly constructed drama activity, create conditions for the movement of all the participants of the learning situation (including the teacher) from the zone of actual development (ZAD) to the zone of proximal development (ZPD).

The elaborated model was tested on the basis of three schools of Moscow and Moscow region with the participation of 336 adolescents aged from 13 to 15 years old. In the framework of the testing, the research group:

- organized 71 drama sessions with adolescents;
- conducted 50 interviews (with the adolescents, who took part in the theater activity, as well as with teachers, school psychologists and representatives of school administration);
- video recorded and analyzed 2470 minutes of videos (including recordings of drama sessions, group discussions, rehearsals, workshops, creating narratives and digital storytelling etc.).

As the result of the approbation, the following principles of organizing school theater as an activity-based learning technology were formulated:

1. *Creating conditions for role experimenting.* The basic principle of the elaborated model is connected with creating an environment where adolescents could solve their most important age task – experiment with roles. Role experimenting in “Digital Storytelling Theater” takes place due to the variety of *different types of joint activity and forms of “obschnostey”*, in which its participants are involved. In the framework of working on the performance adolescents constantly switch from one type of activity to another (writing of the scenario, digital storytelling, acting etc.), moving from one project group to another. In the course of this process, they exchange roles and positions many times – that is, from the very start of the work on the performance till its final rehearsal, they manage “to try on” up to a few dozens of role patterns in the framework of a few “obschnostey” that have emerged.

2. *Step by step.* The alternation of different types of activity in the framework of the created model is orga-

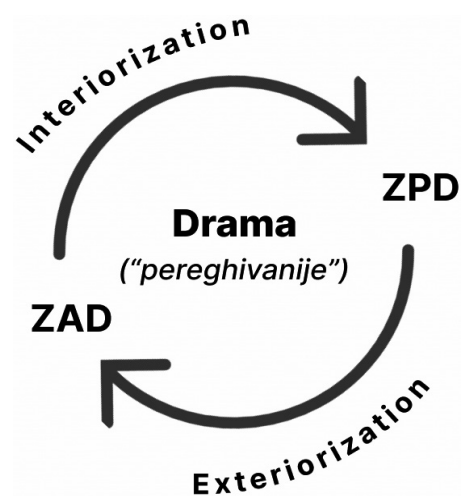


Fig. 1. “Microdrama” and “pereghivaniye” in the process of specially modeled theatrical activity

¹ Here the Russian word “obschnost”, designating a particular kind of community, is appropriate to use.

nized in accordance with certain stages, each of which has its own goal, tasks and structure. The duration and structure of each step depends on the peculiarities of a concrete class or group with which the work is conducted. It is particularly important to pay attention to the very first step — introduction into the project when adolescents acquire the motive to join drama activity, which the majority of them have never faced in the learning process before. A certain significance is also put on verbalization of expectations, emotions and fears of adolescents, which relate to a new form of learning for them.

3. *Orientation on the process rather than on the final product.* Since the main goal of the “Digital Storytelling Theater” is creating conditions for constructing the ZPD for the participants, the emphasis should be put on the very process of the drama activity, that means, on the working process, rather than on the performance itself.

4. *“Safety” of the role tests.* It is important that drama and theater activity are regarded by adolescents as a “safe” space, where they can feel free and experiment without being afraid to get a bad mark, to do something “funny” or “wrong”. It is very important that in the framework of the drama activity, reflexive sessions are held, where adolescents have the opportunity to discuss their emotions and impressions and to share their ideas about the difficulties, that emerge in the working process.

5. *Abandoning of the habitual hierarchy of “teacher—student”.* It is particularly important that during all the stages of the project the teacher acts as an aid, a “co-participant” of the activity, whose main task consists in creating a favorable environment where adolescents could experiment and show initiative. The challenge of this task consists in not allowing “chaos” in the classroom, but rather in delicately accompanying adolescents in those forms of interaction which are new for them.

A successful introduction of drama techniques into the learning process also requires that the teacher pos-

sesses a certain palette of exercises and techniques, that could allow him to incorporate drama activities into the context of concrete learning disciplines («drama across the curriculum»). For this, collaboration between teachers, who teach subjects, with specialists in the sphere of drama pedagogy are needed. Teachers are also asked to regularly attend teacher training and constantly exchange practical experience. Generally, it is very important that in the educational environment there is a positive relation to drama techniques and that teachers are willing to emerge in new practices. It is also important that they are ready to prepare both students and their parents for new types of learning activities

In the place of conclusion

Thus, the novelty of the elaborated model of theater activity based in role experimenting consists in the fact, that in the framework of this model, adolescents experiment with social and psychological objects — roles, positions, and relationships. Drama allows adolescents on the one hand to interiorize cultural norms, values, forms and means of joint activity, and on the other hand — it creates conditions for the exteriorization of adolescents' inner conflicts and “perezhivaniya”, which contributes to their constructively overcoming the crisis of this age period.

On the whole, for meeting the challenge of constructing the ZPD of adolescents in a school theater, it is important to regard drama not as a reproductive work of putting on a performance, that has been created by someone else, but *to organize it as a platform for role experimenting, for trying out different types of activities and “obschnostey”.* This kind of drama is capable of meeting the key age tasks of the adolescent period and at the same time allows them to acquire necessary competences and personal educational results in accordance with the Federal Standards.

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EDUCATIONAL PSYCHOLOGY
ПСИХОЛОГИЯ ОБРАЗОВАНИЯ

Online Higher Education On The Example Of The First University In The World: Open University of Catalonia (Personalized Teaching)

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Online education transforms rapidly due to fast societal changes, especially those related to technological progress allowing the use of networking and digitalization in education. The Open University of Catalonia (UOC – from the Catalanian – Universitat Oberta de Catalonia), created in 1995, is an innovative university rooted in Catalonia and open to the whole world. It is the world's first university with a virtual campus, which allows its students to study at any time from any location. The UOC educational model is dynamic and flexible (designed to adapt and evolve constantly) and based on students personalized mentoring in e-learning. It promotes participation and collective knowledge' building through an open and interdisciplinary approach to students' educational, social, and working experiences. The UOC educational model incorporates collaborative or group learning, guided by tutors who facilitate the educational process through methodologies that involve problem-solving, participation in the development of projects, joint creation of products, discussion, and investigation.

Keywords: UOC; the first on-line university; higher education; Vygotsky's historico-cultural approach; modern social challenges; SDGs in education; digital transformation in education; personalised teaching.

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Высшее онлайн-образование на примере первого в мире университета — УОС — Открытый Университет Каталонии (Индивидуализированное обучение)

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Онлайн-образование быстро трансформируется из-за скоротечных изменений, происходящих в обществе, особенно связанных с технологическим прогрессом, позволяющим использовать сетевое взаимодействие и цифровизацию образования. Открытый Университет Каталонии (УОС), созданный в 1995 году, является инновационным университетом, основанным в Каталонии и открытым для всего мира. Это первый в мире университет с виртуальным кампусом, что позволяет его студентам

учиться в любое время из любого места. Образовательная модель УОС, динамичная и гибкая (разработанная для постоянной адаптации и развития), основана на наставничестве студентов и персонализации электронного обучения. Она способствует приобретению (конструкции) коллективных знаний за счет междисциплинарного и открытого подхода к образовательному, социальному и практическому опыту студентов, а также к индивидуальному обучению. Образовательная модель УОС включает в себя совместное или групповое обучение под руководством наставников, которые облегчают образовательный процесс с помощью методологий, включающих решение проблем, участие в разработке проектов, совместное создание продуктов, обсуждение и исследование.

Ключевые слова: УОС, первый онлайн-университет, высшее образование, историко-культурный подход Выготского, современные социальные вызовы, ЦУР в образовании, цифровая трансформация в образовании, персонализированное обучение.

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Introduction

This work is a short review of the first online model of higher education using the example of the Open University of Catalonia (UOC, Barcelona, Spain). The key characteristics of this model, together with an analysis of the basic principles of the cultural-historical approach of Vygotsky, are provided here.

Basic principles of the historico-cultural approach

The Vygotsky historico-cultural approach to the development of the human psyche considers the formation of the psyche in its ontogenesis as a phenomenon of cultural origin [1, 2]. The essence of the cultural-historical concept can be expressed as follows: The behavior of a modern, civilized person is not only the result of development from childhood but also a product of his or her historical and cultural development. In the process of historical development, not only the external relations of people and the relations between man and nature are changed and developed, but man himself is also changed and developed [1–3]. Some of these principles, as described by Vygotsky, are mentioned below:

- The principles of activity, initiative, and subjectivity in development
- The state of development is never determined only by its mature part; it is necessary to take into account the maturing functions, or the zone of proximal development, since today's zone of proximal development will become for the child tomorrow's level of development.
- The social environment is the source of a child's development.
- The same environmental impact affects children of different ages differently due to their different age characteristics.
- The influences of the environment themselves change depending on the psychological characteristics of the child they are superimposed on.

- Learning is the driving force behind the development of the child, and learning is understood in the context of the concept of the zone of proximal development.

The main conditions for the full development of the child are communication between the child and the adult and the normal development (maturation and functioning) of the child's nervous system. Moreover, the functional development of the nervous system, on the one hand, is a condition for personal, intellectual, and physical development, and on the other hand, it depends on their development [1, 4].

These principles were interpreted by Davidov (cited in Rubtsov [5]): 1) qualitative change in social situation is a basis for the development of a human being, which is also reflected in his activity; 2) learning and upbringing are universal points of a human's mental development; 3) the initial person's form of activity is social (historico-cultural context); 4) new psychological formations, which emerge in a human being, are derivative from his or her interiorization of the initial form of activity; 5) different sign and symbol systems play a significant role in the process of interiorization; and 6) the internal unity of intelligence and emotions is an important part of the human consciousness' activity.

Though these principles were described by Vygotsky with reference to children who were more intensively developed and adapted to the social environments of the specific historic and cultural moment they belonged to, all these principles are valid for all persons, including adults who also continue to learn and change themselves during their lives.

The UOC as the first world on-line university

The main context of the social historico-cultural approach is linked to its main principle: dynamic changes in the environment and culture on the whole. And one of the examples of such a change is societal digitalization and the use of informatics and other tools in education, including e-learning. And one of the practical examples is the creation of the UOC—Universitat Oberta de Cat-

alonia—a university to learn at a distance that was transformed later into the first online university in the world.

In March 1995, the Catalanian Parliament approved the establishment of the Open University of Catalonia as a response to new societal challenges (establishing innovative distance education) that would address the emerging needs of its citizens. The novelty of this university was to focus exclusively on virtual education, which would allow more inclusive access for students with disabilities or other limitations to access face-to-face studies and also provide flexibility for those who chose to combine work, family, particular lifestyles, or personal factors with virtual learning to achieve their educational objectives [6]. The goal of the UOC, designed as a complementary university to the existing higher education system, was to provide the highest quality university education based on distance learning with the use of new technologies.

- The Open University of Catalonia has a flexible and open education model designed to maximize the advantages of current and emerging information society technologies and adapt to rapidly changing new technologies. Based on a flexible and open education model constructed to maximize the advantages of current and emerging information society technologies, the UOC was designed to be an efficient alternative to distance higher education with the following characteristics [6].

- A commitment to be rooted in the cultural, social, and linguistic reality of Catalonia while remaining open to the world.

- Knowledge is available for everyone, despite time and space constraints.

- A special focus on lifelong learning.

- Use of high-quality and innovative teaching and learning models.

- Intensive application and use of new information and communication technologies.

- A commitment to research and development in the emerging information society.

- Service to the student and society.

- Cooperation and coordination with the country's university system.

- An ethical commitment to society.

- A new university organizational model” [p. 4].

The values of the Open University of Catalonia are the following: 1) commitment to their students, graduates, and society, to service quality, and to innovation as a mainstay of the organization; 2) respect for people, ideas, cultures, and the world; 3) transparency in information, data, and processes; 4) professionalism by empowering the people who belong to the organization, acknowledging successes, and learning from mistakes; and 5) sustainability by ensuring the economic, social, and environmental sustainability of the organization's activities.

The absence of rigid and less permeable structures in some departmental structures of the UOC has contributed to the success of the change process [7], as has interdepartmental connection, which allows the educational process to be more flexible and have interdisciplinary content.

The UOC's teaching model was not only proven by time but also by new societal emergencies, such as the

COVID-19 pandemic, when almost all face-to-face universities (due to local lockdowns) needed to adapt the distant model of education, and hundreds of the world's leading universities asked to help and share the experience of the UOC with them. During the first pandemic year (the 2019–2020 academic year), the UOC had 56500 active students (40500 were undertaking bachelor's degree studies and 16000 were undertaking master's degree studies) [8]. Currently, the UOC counts 87,000 students and 104501 graduates from 28 bachelor's and 52 master's degree programs (see Fig. 2 for more details on the educational offer of the UOC).



Fig. 1. UOC's digital transformation that helped to guide teachers in the COVID-19 pandemic Adapted from: Source: <https://www.uoc.edu/portal/en/index.html>

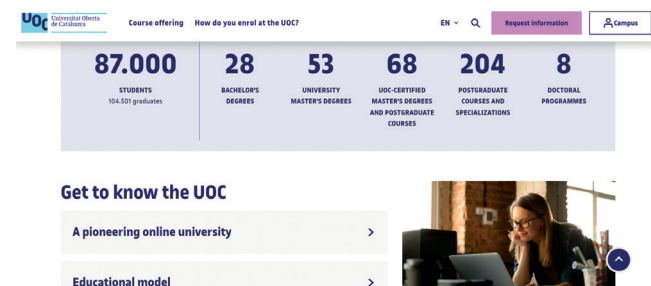


Fig. 2. UOC in numbers Source: <https://www.uoc.edu/en/studies>

The main objective of UOC is to provide lifelong learning opportunities to everyone, regardless of distance or other circumstances. The UOC is a pioneer in online learning that accompanies governments, education systems, and institutions in their digital transformation, helping in the development of their own online model on three levels: teaching, technology, and organization. Other objectives of the UOC to be achieved that

are also aligned with the 4th SDG on “quality of education” [1]: 1) to facilitate equal access to higher education for everyone; 2) to offer education adapted to the needs of each person; 3) to provide training in global and digital competencies in classrooms with a diverse and international student body; 4) to improve the methods of teaching teams in virtual environments; and 5) to help institutions and organizations boost online education.

The UOC teaching model

The educational model of the UOC [9] is unique, innovative, and endorsed by governments, education ministries, and educational institutions around the world based on three main axes: completing activities, and continual guidance and support (Fig. 3).

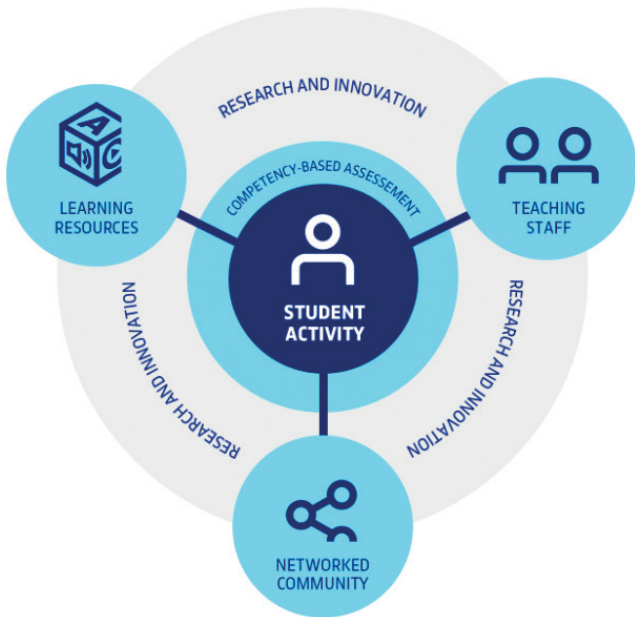


Fig. 3. The educational model of UOC Source: <https://www.uoc.edu/portal/en/metodologia-online-qualitat/model-educatiu/index.html>

The students are involved in the educational process through ordinary actions [8], which is in compliance with the first Vygotsky’s principle, “to educate through action”. For the UOC community, the virtual campus is where it all happens. The campus has virtual classrooms where students can find their course instructors, tutors, and fellow students, as well as their activities, materials, and tools for learning. “Despite being online, professor-student contact at the UOC is probably more intensive and more direct than in traditional universities,” as sharply noted by Prof. Martin Carnoy from Stanford University (for this and other opinions, see Fig. 4). This is another principle of the social approach and constructivism in the education process emphasized by Vygotsky and his followers. The uniqueness of the UOC lies in a tighter individual relationship with students since all of them are involved in communication with their teachers. To communicate by written means also allows those who are more shy to speak orally and approach their tutors and classmates via formal (mails, debates) and semi-formal (forums) ways. The educational process is based on both individual and

group (in collaboration with other students from their classrooms) work activities and projects.

Another feature of the UOC teaching model, even if we compare it to other remote or distant universities, is the “non-synchronicity” of the classes. During the pre-fixed educational plan, with an assigned period to complete the classes and related tasks, students have the flexibility to do it on a schedule that is more appropriate to their circumstances. It is especially important for those who combine their studies with work (especially with different turns) and family duties (children, taking care of elder family members), or during illness, etc. Students study at their own pace, in an individual rhythm that provides more flexibility and enhances the learning process in the most efficient way.

Students develop three core competencies during their studies at the Open University of Catalonia: 1) high-level digital skills; 2) strength when it comes to organization and planning; and 3) know-how for online collaborative work.

The educational process is accompanied by three types of teaching staff: 1) a coordinating professor who designs the course, guarantees its quality, and coordinates the course instructors; 2) a course instructor who guides and assesses students learning as they progress in their courses; and 3) a tutor who advises students on choosing a personalized academic pathway during their time at the UOC.

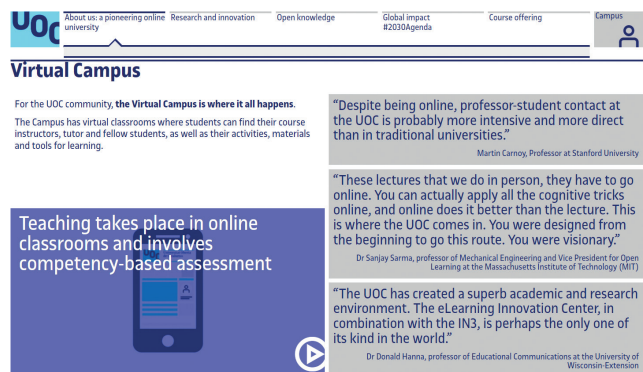


Fig. 4. The worldwide professors’ opinions from the lead universities Source: <https://www.uoc.edu/portal/en/metodologia-online-qualitat/model-educatiu/index.html>

The educational materials are available in a variety of formats (docs, pdfs, videos, audio, and specific programs like SPSS, Atlas for quantitative and qualitative data analyses, etc.) so that students can make the most of the time they spend learning. A virtual library provides access to a wide range of scientific articles, books, and other resources and useful links to support the learning of the students and make the educational process more professional [10]. All these resources as well as course designs are adapted to e-learning and also to societal changes and students’ needs, especially in computer sciences, statistics, and other areas related to new technologies [11].

The UOC’s learning experience is based on faculty-librarian collaboration, seen as the best option for promoting student engagement and with benefits in pedagogy innovation, resource management, open educational re-

sources applied in virtual classrooms, promoting information literacy, and training in 2.0 tools used in teaching [12]. With this new approach, applied in the UOC educational system, teachers change their role from instructors (who mainly give information) to facilitators (who accompany and guide) of the learning process and extend their reach to students.

The example of the virtual classroom is shown in Fig. 5 (with more details of the heading information in Fig. A1). It contains the title and code of the course, followed by the docent plan, on which both students and tutor can move from the current position back or ahead, if needed, to check the activities and the contents of the correspondent resources. The vertical horizontal line shows the current activity in the process, and below are shown the period of performing it, the dates of delivering the activity report, and the tutor's feedback on it. On the right side, there is also a register of the main activities with continuous assessment, based on which the students obtain their final semester's grades.

Communication in the virtual classroom goes through three main channels: 1) the news table; 2) debate; and 3) the forum (Fig. A2). The most important information is published by a tutor on the news table, such as information about new activities, for example, or rules on ethics and plagiarism. The debate area is devoted to discussions and also to publishing the students' practical works or assignments. They are visible to all classmates, as well as the tutor's feedback, which may help in the education—not only comments on one's own reports and questions but also those of others. In the less formal channel, the forum, students may discuss and reply, helping each other with work and resolving their doubts. The tutor participates as a moderator, clarifying some issues or doubts. This model of studying encourages students to help each other and to learn together.

The Open University of Catalonia sought to be an academic environment adapted to the challenges of modern society. It is recognized as one of the first universities in the world to have 25 years of experience. The COVID-19 pandemic pushed for more online education during the strict lockdowns in many countries, and the UOC experience was shared worldwide.

Conclusions and future directions

The UOC's educational model has proven its functionality and effectiveness over time. Due to the exponential increase in students and programs, the model shows the popularity and constant societal demand for such types of education, which serve as a good complement to the traditional ones. By doing this, it opens doors to those who cannot arrive in physical rooms (due to distance, time restrictions, or other physical or economical limitations) and allows for increased inclusiveness in obtaining a higher degree of education with the use of internet tools.

To show the future direction, I'd like to refer to Prof. Michael Murphy's (president of the Association of European Universities) words at his inaugural lecture enti-

tled "Universities without walls. Adaptation to Change in Europe" at the UOC academic year 2022–2023 (October 27, 2022): "European universities must work together because universities are the engines of much innovation and many social changes."



Fig. 5. An example of the virtual classroom Source: The Teaching Access Platform



Fig. A1. The components of the virtual class-room

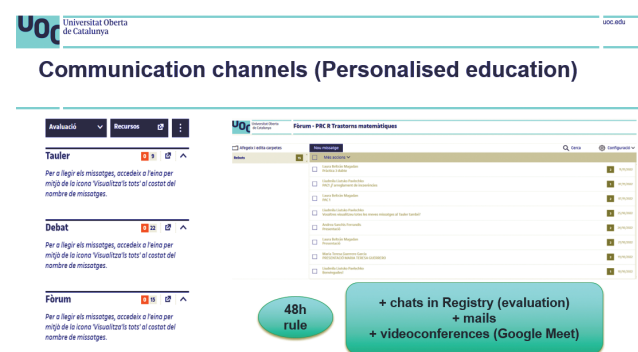


Fig. A2. The virtual room's components

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Toward the Results of the International Congress “L.S. Vygotsky and A.R. Luria: Cultural and Historical Psychology and Issues of Digitalization in Social Practices”

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The international scientific community turned to cultural-historical psychology to find solutions to the issues caused by the introduction of new tools into social practice – digital tools and artificial intelligence, embodied in the international congress: “L.S. Vygotsky and A.R. Luria: cultural-historical psychology and issues of digitalization in social practices”. The cross-cutting theme was the definition of the place of the digital medium in human life. Summarizing the results in a brief form, we identified five areas: defining the essence of the digital medium, its limitations and possibilities; highlighting the limits of its use; irrationality and rationality in relation to the “machine”; the role of the adult in learning and communication with the child when using digital media; the requirements for digital media in the boundaries of safety. In each area, the main provisions of cultural-historical psychology are examined in depth through the prism of their applicability to contemporary reality. The notions of “social situation of development,” tool and sign, interiorization and zone of the nearest development, age and its features, mediation and others showed not only their theoretical viability, but also the practical necessity of their application.

Keywords: cultural-historical psychology, digital tools, tool and sign, mediation, development.

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К итогам Международного конгресса «Л.С. Выготский и А.Р. Лурия: культурно-историческая психология и вопросы цифровизации в социальных практиках»

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Обращение международного научного сообщества к культурно-исторической психологии для поиска решения вопросов, вызванных внедрением в социальную практику новых средств – цифровых средств и искусственного интеллекта, воплотилось в международном конгрессе: «Л.С. Выготский и А.Р. Лурия: культурно-историческая психология и вопросы цифровизации в социальных практиках». Сквозным являлось определение места цифрового средства в жизнедеятельности человека. Обобщая в краткой форме результаты, мы выделили пять направлений: определение сущности

цифрового средства, его ограничений и возможностей; выделение границ его применения; иррациональность и рациональность по отношению к «машине»; роль взрослого в обучении и общении с ребенком при применении цифровых средств; требования к цифровым средствам в границах обеспечения безопасности. В каждом из направлений глубоко рассмотрены основные положения культурно-исторической психологии сквозь призму применимости их в современной реальности. Понятия «социальная ситуация развития», «орудие и знак», «интериоризация и зона ближайшего развития», «возраст и его особенности», «опосредование» и др. показали свою не только теоретическую жизнеспособность, но и практическую необходимость их применения.

Ключевые слова: культурно-историческая психология, цифровые средства, орудие и знак, опосредование, развитие.

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The picture of the world of "fantasy societies" in the context of historical time has a place for its realization. Our mental images, underpinned by convictions and goal-directed actions, are the point from which the "meeting of the motive with the object" takes its distance.

The desire of human society to raise as its future man of culture, which means honoring traditions and developing through his work the well-being for himself and subsequent generations, without disrupting social existence, is the filter through which what is created and created is deposited in culture. Science fiction of "a century ago" with its first words about the robot is already realistic today. The questions that excited Karel apek, Stanislav Lem, Isaac Asimov and others are being addressed today by digital means and artificial intelligence, by introducing the cultivation of a cultured person into our life activities, economic organization and social practices.

At the international congress on cultural-historical psychology "L.S. Vygotsky and R.A. Luria: Cultural-Historical Psychology and Issues of Digitalization in Social Practices" (November 15–17, 2022.) was devoted a lot of time to discussing in sections, round tables, master classes, meetings, sessions and plenary session the issues of what we have already encountered as contradiction, boundary, permissible possibility, destructive consequence, optimal condition, etc., more precisely questions of what we have created, for what, and what are the consequences?

It is an amazing situation, repeated many times in history, when by collective labor something is created, and then it is understood and pondered that there is this something that begins to define human life. The creator himself falls under the power of what he has created. The effect is a well-known one in the field of art. Isn't the art of perfecting tools? Digital tools and artificial intelligence are gaining a high speed of their change, increasingly embracing and taking over the life of man, who has no time to comprehend and find an ad-

equate place for these tools in his life. The machine is "running" ahead of human awareness of it. That is why the international congress, aimed at figuring out and determining the place of the new tools in the fields of practice that set the future of humanity, highlighted the problems and sought their solution on the basis of cultural-historical psychology, that psychology in which the cultural man – the individual is the peak, and, in a sense, the final point in the social practice of interaction between two and more people in the process of learning, communication and activity.

The list of issues under discussion is far from simple, and all of them are about the role of digital transformation in the life of a person, a child in particular. The very semantic content of the phrase "digital transformation" shows that we recognize the tremendous change of a person, his life, caused by the use of digital tools. The issues of psychophysiological, neuropsychological, physical, psychosomatic, personal, social, organizational changes in human life were considered during the Congress.

The Congress worked on determining the boundaries in which the digital medium works most effectively to achieve the necessary results in the practice of education, psychosocial assistance, leisure, developmental additional education and support for the development of people with disabilities. The question of boundaries is the most important, its solution was determined by the observance of the laws of development, highlighted by L.S. Vygotsky within the framework of cultural-historical psychology. Summarizing the results of the joint work of scientists and practitioners, it is possible to formulate the following.

1. According to the laws of development singled out by L.S. Vygotsky, a digital tool, like any other tool in the hands of a child and an adult, should provide for the implementation of interiorization and socialization.

By mastering a tool and talking it through, the child goes through a complex chain of forming connections between the adult, child, tool, appropriation, purpose, social forms of thinking and behavior through a process

of symbolization when it is no longer necessary to dance a ritual dance of a successful hunt around a large animal, but to draw this animal, comes to a sign form of thinking, masters a sign that carries the properties of the object it has replaced for the child.

The natural natural process of development uncovered by L.S. Vygotsky presents itself in a different way in the operation of the digital medium, thus affecting socialization, behavior, thinking and speech in general. In the discussions and reports of the congress it is possible to piece together the large-scale restructuring taking place in the relationship "adult-child", "child-play", "child-other child".

The main feature of the digital medium is high informative, responsive, symbolic and, importantly, bright and dynamic, affecting attractiveness. Weapons — a car and a doll, traditional two-century toys — have moved into the category of drawing, controlled by a button. How then can there be a process of sign formation that assumes the basis of cultural thinking and consciousness, that penetrates the essence of art, that objectifies universal values.

The total capture of the processes of mental function development by digitalization is no more than a decade old. The cultural-historical psychology of an intelligent manager, teacher, educator, etc., can lead to the right solutions for preserving the natural state of the human psyche. After all, it is not known, in its entirety, what will happen to man when symbolic forms replace the other person, communication, experience, etc. In this direction of humanity's development, drawn by science fiction writers to a human-robot, a cyber-human, in order to preserve humanity, apparently, there is no need to move forward. In order to do so, it is necessary to define an adequate place for digital tools.

2. The adequate place of the digital medium in the life of the child and adult has its limits.

At the congress it was said about the boundaries of age, time (for example, no more than 2 hours a day of work and play with a gadget for an elementary school child), intellectual, health, etc. Non-observance of optimal limits, set experimentally, can lead to various disruptions, for example, in socialization (development of addiction), in health (stress), and even to financial losses, along with the gains in the case of games and other activities provided by digital platforms.

Defining the place of digital tools in society has led to the emergence of new disciplines in teaching, such as Digital Financial Literacy, Robotics; Gamification, Artificial Intelligence Development Club activities, etc. Such forms of work as design, modeling, implemented in training, most qualitatively develop with the application of digital tools that help to optimize organizational communication.

Opportunities for the use of digital tools in human life are many and this dictates the need to develop safe-

ty rules. This direction is likely to develop in the near future.

3. The use of a digital tool is determined by the criteria of optimization, age appropriateness and enhancement of work (learning). Consequently, not only those who develop these tools, but also those who apply them, cannot be replaced by this tool.

The fears of a "machine future" drawn by literary images have no realistic and reasonable logical basis, even in perspective. The aspirations of the developers of AI and digital tools are ambitious, and the cultural-historical psychology of a hundred years can reveal the difference between aspiration and possibility, conditioned by nature itself, before which man, like before himself, does not have full power. Metaphorically one might say, "the typewriter and the doll will not come off the production line" if the rationality of "not chopping off the bough on which you are sitting" will stop the hunger, quenched not by works of art but by the informational saturation, for which "souls have no time".

4. In the process of regulating the use of the digital medium, the role of the adult is great.

It is from childhood in the generation that begins its journey with the "digital" that the adult who broadcasts the culture teaches the place, the boundaries and the adequate ways of application of this medium in the child's organization of his or her own life. The age limits are lowered for the child's self-organization, as well as for the development of reflexion, which follows the development of logical thinking; without waiting for adolescence, it should become the child's attitude towards the number as a means, not as a natural tool or a symbolic sign, but as something new, which carries this tool — a natural symbolic tool capable of positively influencing the development of abstract thinking.

Consequently, adults need to direct their educational and teaching efforts toward the development of reflexion in children, and, consequently, toward the development of logical thinking, not to the detriment of the development of visual imagery. A unique, unexplored developmental situation is taking shape for which cultural-historical psychology with its concept of development is the fundamental basis.

Age boundaries of development change in accordance with changes in the social and technical state of society, but the essence of developmental processes remains the same, as do the laws of the child's mental development. The adult organizes a "social situation of development" for the child, in which cultural forms of behavior are formed and cultural psychological functions develop.

Due to the uniqueness of the current situation, new ways of learning are to be developed in which the abilities of problematization and self-determination, choice and acceptance of responsibility can be formed at earlier ages to master the ability to control the digital medium. "Digital literacy" is not enough to meet these chal-

lenges. Rather, a set of training disciplines synthesizing knowledge of psychology, psychophysiology, medicine, pedagogy, didactics, philosophy, and cultural studies is needed to develop training programs for future parents regardless of their professional specialization. Universal literacy along with digital literacy is urgent in the care of our not-too-distant future.

5. The studies presented at the congress showed the need to make demands not only of culture, the child, the adult, the "social situation of development", etc., but also of the digital medium itself, developed by man himself for himself and his own kind.

Sometimes the category of the "Other" gets lost in the technical refinements and piles of "soldered circuits". It has been noted that the digital manufacturing giants have turned their attention to training, education and upbringing to address the discovered gap between the technical medium and the human being. Creating digital educational platforms for children and adults, their co-creation, is a step forward to a future that guarantees the preservation of the human psyche.

Putting filters on the information provided by the global network of the Internet is a condition for the safety of the mental, value, moral and moral development of the child and adult. The inclusion of controlling functions over the Internet is to protect the interests of the consumer, including the child, from unauthorized influence. The above examples are far from exhausting all the measures taken by the authorities to regulate the

relationship between man and the digital medium. Such regulation is extremely necessary due to the peculiarities of this medium and the possible serious destructive effects that society has not yet experienced from other available means in its arsenal of use.

The advent of the computer has accelerated life and activity by speeding up the movement of information, which mental processes must, but should not, keep up with. Information is the engine of productive forces, and the individual must be able to cope with it as well as with the accelerated rhythm of life.

The debate unanimously affirmed the need to strengthen natural mechanisms of self-regulation through social and governmental measures in order to maintain developmental homeostasis while incorporating new (digital) means into the social practice of life.

These "red thread" issues have been acquiring foreseeable forms of proposed solutions and are included in the published proceedings of the International Congress "L.S. Vygotsky and A.R. Luria: Cultural and Historical Psychology and Issues of Digitalization in Social Practices. International Congress, November 15-17, 2022. T. E. Sizikova, G. S. Chesnakova, Ministry of Education of the Russian Federation. Novosibirsk: National State Pedagogical University, 2022. 443c.", in the special issue of the journal "Cultural-Historical Psychology" (2023. № 2) and in the special issue of the journal "Culture and Education" (Australia).

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Ontogeny of Evolution: from Instinctive Actions to Activity

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It is shown that the child goes to educational activity through spontaneous activity, objective action, quasi-joint activity, game activity. The educational activity is considered as a cooperative activity, which is based on individual activity. Specific function of motivation and desirability of a child and an adult at different stages of their interaction is shown on the basis of the ontogenetic “arousal – activity” analysis. The article demonstrates the key terms of the structure of educational activity by D.B. Elkonin, its positive aspects and limitations. The author’s concept of the general psychological structure of labor activity is substantiated methodologically and theoretically, and on this basis a competence-based model of the structure of the school pupil’s educational activity is proposed, which can be used as the basis for diagnosing the readiness of a school pupil as a subject of educational activity. This allows us to answer the question: has the child learned to learn?

Keywords: action, activity (cooperative, game, educational, labor), objective actions, quasi-joint activity, motive, purpose of activity, systemogenesis, psychological system of activity, competence, skills set.

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Онтогенез: от инстинктивной активности к деятельности

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Показано, что к учебной деятельности ребенок идет через спонтанную активность, предметное действие, квазисовместную деятельность, игровую деятельность. Учебная деятельность рассматривается как совместная, в основе которой лежит индивидуальная деятельность. На основе онтогенетического анализа «активности—деятельности» показывается специфическая функция мотивации и целеполагания ребенка и взрослого на разных этапах их взаимодействия. Рассматриваются основные положения структуры учебной деятельности Д.Б. Эльконина, показываются ее положительные стороны и ограничения. Методологически и теоретически обосновывается авторская концепция общей психологической структуры трудовой деятельности и на этой основе предлагается компетентностная модель структуры учебной деятельности школьника, которая может быть положена в основу диагностики подготовленности ученика как субъекта учебной деятельности. Это позволяет дать ответ на вопрос: научился ли ребенок учиться?

Ключевые слова: активность, деятельность (совместная, игровая, учебная, трудовая), предметные действия, квазисовместная деятельность, мотив, цель деятельности, системогенез, психологическая система деятельности, компетентность, компетенции.

Origin of mental setup

An infant receives primary information from his sensations, which are realized by specific physiological systems. Sensations give the subject the information about “... individual objects characteristics (signs) or psychological experience of the effects on the sense organs by individual stimuli (flows of energy: light flux, sound vibrations, vibration, chemicals, mechanical pressure, infrared radiation, ultrasound, etc.)” [6, p. 248]. Mono-sensations interact with each other, giving the subject an idea of a certain quality of the object. V.A. Ivannikov gives the following example on this occasion: “A smooth surface of an object appears to the subject both as a shiny (in vision), and as a slippery (in tactile sensation), and as a cold (in temperature sensitivity) surface” [6, p. 240]. Thus, sensations act as languages that give the subject in different subjective sensations signs of an objectively existing object with which the subject interacts. “The characteristics, presented in the subjective language of signs, are behind the subjective features of objects objective” [6, p. 249]. Unfortunately, Ivannikov writes, “... this dual nature of sensations is not realized by many people even until nowadays: to be the language for which each individual analyzer (the sensory organ and the corresponding parts of the brain) is responsible, and the description of external influences in this language” [6, p. 249].

Here we come to the main question: where does the psyche begin and what is the psyche? By answer to this question, we will also define the subject of psychology.

Let's turn back to feelings. They give us information about the individual properties of objects in the surrounding world. *But only the thought determines the connection of the thing's characteristics with a thing.*

Consequently, sensations in their connection with the thing, which characteristics they reflect, generate thought. Right here the secrets of the psychology subject are hidden. As the source of objective thought, the last one in its development is associated with the needs of the subject and his experiences. Elements of subjective experience are introduced into thoughts, because the thought is always generated by acting person. The thought acquires a functional meaning and personal sense through the activity of the subject [more details: 17; 20].

Thus, the psyche is formed by thoughts and their aggregates. It acts as a subject of psychology in this capacity. The evolution of mental setup begins from the moment of birth, from the first interactions of a baby with the environment and, above all, with his mother. After that it keeps on for the whole life. “Defining the subject of psychology,” S.L. Rubinstein writes, “one could say

that psychology studies the psyche... But the content of the formula according to which psychology studies the psyche remains very vague and problematic until it is determined how the psyche is understood” [12, p. 39]. Only the appeal to thought allows us to determine what is thought and what is the psyche.

Newborn activity

A newborn baby has needs and is armed with some instincts. Let's distinguish the sucking instinct and the imitation instinct. Biological need is expressed in the biological motivation of behavior aimed at satisfying an urgent need.

The biological basis of the infant conscious behavior is a complex system consisting of the integration of three neuronal subsystems: afferent-independent, afferent-dependent and intermediate.

With the safe birth of a child and the timely presentation of the mother's nipple to him, genetic information becomes integrated with the information of the environment focused on the mother's nipple and forms sucking behavior. “Thus, a new and inseparable functional association and interaction of mother and child appears in the postnatal period for a long time, replacing the intra-uterine community of fetus and mother” [13, p. 67].

While a variety of definitions of biological theory have been suggested, this paper will use the definition this question not up to psychological point of view. Here we have the germ of “joint activity”. In fact, the child shows motivation, which under certain conditions (contact with the nipple or binky) leads to activity (sucking movements), accompanied by positive emotions. Under the influence of the child's motivation, mother makes a number of actions: determines the breast-feeding posture in holding, takes into account the energy of sucking and grabbing the breast by the child, maintains the feeding regime and the duration of feeding, determines whether the child is full (how much milk he sucked).

The child shows activity directed by the mother's activity. Activity is instinctive, aimed at maintaining life. The mother's activity (behavior) is conscious, purposeful, having its own motive and informational basis (signs of the child's behavior). The mother makes certain decisions and performs purposeful actions during the feeding process. She controls the child's behavior and decides to stop feeding.

There is no joint activity here yet, but there are prerequisites for it, and these prerequisites are inherent in the nature of the child, in his desires and instincts. It is relevant to suppose that by reflex activity the child,

directs and controls the behavior of the mother, who is determined by her love for the child and is characterized by an expanded structure.

At the same time, single sensations associated with the mother give rise to thoughts related to the mother, the needs and experiences of the child himself. An indissoluble connection between mother and child is established in these thoughts and feelings, the first thoughts are formed, which become the content of his psyche, its basis; the child's relationship with the outside world is laid.

Recently, researchers have shown attachment of a fetus to his mother is formed even in the perinatal period [5].

Objective action. Quasi-joint activity

Child development is determined by a genetic program, which involves the formation of certain functional systems based on information coming from environment. At the first stage obtaining this information is associated with an indicative reaction, which is defined as "a multicomponent reflex (involuntary) reaction of the human and animal body caused by the novelty of the stimulus. Synonyms: orientation reflex, research reflex, reflex "What is it?", activation reaction, etc." [2, p. 359].

A child reflex activity in combination with the orientation reflex is directed to the mastery of external objects. An adult comes to the aid of a child in this desire to master objects that attract his attention with novelty. Here we meet with the phenomenon that we will define as *distributed action*. *The motive and the desire to master a new subject* comes from a child, and *the way to realize this desire* in an objective action comes from an adult. The child's activity remains reflectory, and the adult directs this activity, creating a situation of novelty, and then helps the child (*based on imitation*) to master the desired subject.

Based on an indicative reaction, "... orientation activities aimed at mastering the surrounding objects are formed and developed in order to obtain the information necessary to solve the tasks facing the subject" [2, p. 359]. In the expanded form, the indicative reaction is realized by the functional physiological system. In the combination of reflectory activity and indicative reaction, the objective action is born.

Data from several studies the field of neuroontogenesis suggest that "... it is important not only to have the necessary ordinary effects, but, most importantly, their timely presence" [13, p. 86]. One of the main tasks of an adult at this stage of a child's development precisely lies in the timeliness of creating an environment enriched with new objects that will bring new information to the child. The program for the formation of the content of the psyche, sensory, motor and communicative development of the child continues to be implemented in this knowledge of the surrounding world.

Distributed action is a prototype of cooperative activity. It combines natural mechanisms (involuntary motivation, the desire for novelty and imitation) with a detailed structure of an adult's action, which has a purpose to organize the child's actions by filling in the missing components of the latter's action: goals, conscious information basis, methods of action, reflection of the results of the action.

The development of the child's activity follows through the path of mastering individual actions in the structure of a specific activity.

Taking into account the fact that child's activity is not formed in all components and it is carried out in interaction with a full-fledged structure of adult actions, such activity can be defined as *quasi-joint*.

The analysis shows that the ontogenesis of activity proceeds from reflectory activity associated with natural motivation, orientation reaction and imitation, to distributed action and quasi-joint activity. The evolution of activity is closely related to the life tasks that child solves and the environment in which he is located.

The child's development is carried out in activity and through the activity: motor, sensory, intellectual, communicative. But to define development in this way is only to designate the area of development, without affecting its essence. The essence lies in the fact that the knowledge of the world occurs through the thoughts that are generated in action and through action, and then formalized in the word [17]. Thoughts express not only the properties of objects, but also the characteristics of movement and the properties of people the child comes into contact. As S.L. Rubinstein defined "... the initial type of *thinking* is thinking in action and by *action*, thinking that is accomplished in action and revealed by action" [11, p. 311].

Play activity

A significant role in the child's development belongs to the game as one of the forms of activity. He doesn't know how to play. He should be instructed how to play. The game reflects the adult world, embodies the abilities of those who made the toy, reflects certain social roles. Child must rise to the knowledge and skills that the toy assumes for playing with it.

Fundamental analysis of play activity is presented in the work of A.V. Karpov [7]. Based on D.B. Elkonin's study [22], Karpov suggests the following structure of the plot-role-playing game (Fig. 1).

The following units are distinguished in the game: role, plot, game action, game interaction and game rules. The game is filled with meaning by the plot and action. The system of rules gives the game a certain structure, bringing it closer to the normative way of activity; interaction translates the game into joint activity. Thus,

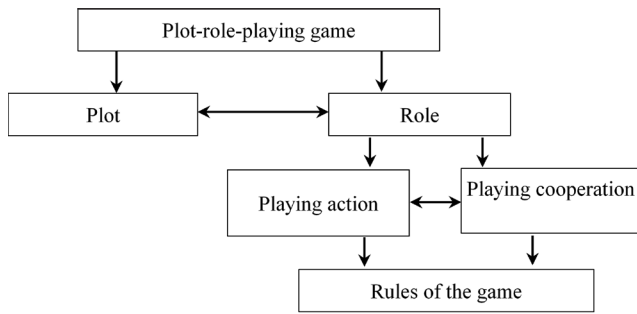


Fig. 1. Structure of the plot-role-playing game

the game merges the subject of individual activity and joint activity. The game is self-determined, it gives the player a wide range of experiences: pleasure-displeasure.

Methodological and theoretical analysis of the game and play activity allowed A.V. Karpov to draw an important conclusion about the result of the game as "... the main demarcation line between gaming activity, on the one hand, and educational and work activities, on the other" [7, p. 38]. He showed that as the game becomes more complex, interest shifts from the procedural side of playing activity to its result, from procedural motivation to effectiveness.

The provision on the system-forming role of the goal in the play activity is not less important. According to A.V. Karpov "the goal of play activity is that it does not ensure the formation of an integral and complete structure (and even more so, a system), but underlies only one or another achieved at each age stage and constantly increasing structurality and consistency of its organization. In the end, this leads to the fact that in relation to play activity, it is more correct to assume that not any of its "rigid" structure is being formed, and even more so its psychological system. It develops (and even lays down), and subsequently develops structurality itself, and then systemicity — as a form of organization of its psychological activity" [7, p. 48]. This approach creates conditions for the relatively free formation of future components of the system of playing, educational and subject activities.

Thus, the child goes to educational activity through reflex activity, objective action, quasi-joint activity with an adult, aimed primarily at mastering his body through play activity, laying the target effectiveness and motivation. The educational activity itself is presented as a joint activity, which is based on individual activity.

It should be noted that a child approaches admission to the first grade with a formed inner world, the basis of which is everyday concepts, and a certain level of development of abilities. The transition to schooling is associated with the formation of scientific concepts, which should be based on everyday concepts in primary school. The formation of conceptual abilities is an important factor of development at this stage of life [16].

Educational activity

The logic of our analysis leads us to the need to move on to the consideration of educational activities. Let us turn first of all to the ideas about educational activity formulated by the outstanding Russian psychologist Daniil Borisovich Elkonin. Daniil Borisovich outlined its structure in the article "On the structure of educational activities" [21].

Let us consider the structure of educational activity in more detail due to its significance. According to D.B. Elkonin the formation of educational activity "... is the most important task of learning — a task no less important than the assimilation of knowledge and skills" [21, p. 214].

D.B. Elkonin has repeatedly insisted that the formation of educational activity is a process "... long and takes place at all training sessions" [21, p. 214]. Based on the study of this process, D.B. Elkonin proposed a general structure of educational activity consisting of four interrelated components: "...1) an educational task, which in its content is a method of activity to be assimilated; 2) educational actions, which are actions as a result of which a representation or a preliminary image of the action being assimilated is formed and the initial reproduction is made images; 3) the action of control, which consists in comparing the reproduced action with the sample through its image; 4) the action of assessing the degree of assimilation of those changes that have occurred in the subject itself" [21, p. 219]. At the same time, D.B. Elkonin emphasized that this structure of already formed educational activity, "... however, it becomes such only at a certain stage of its formation" [21, p. 218]. Different academic subjects have different opportunities for the formation of individual components of the structure and only from their interaction a full-fledged general structure of activity is able to be formed. D.B. Elkonin [23] later added a fifth element to the proposed structure — motivation.

Let us express our attitude to the presented structure. Supporting D.B. Elkonin's point of view on the process of formation of educational activity, we consider it necessary to make the following clarifications and additions:

Firstly, it should be emphasized that educational activity is formed not only under the guidance of a teacher, it is formed in the joint activity of a pupil and a teacher. It is necessary to have knowledge about the pupil's learning activities and the teacher's learning activities, as well as about the patterns of their interaction for doing it. The joint activity of a pupil and a teacher should be considered according to L.S. Vygotsky's position on the zone of proximal development attributed to the structure of the activity of a pupil and a teacher.

Secondly, it is impossible to limit ourselves to a remark about the long process of formation of educational activity. It is necessary to consider the process of forming a system of activity from the standpoint of the systemogenesis of activity [18; 20]. "It should be noted that in the research of Yu.N. Slepko, an attempt was made to systemogenetic analy-

sis of the development of the psychological functional system of activity. It was shown that in the process of systemogenesis of educational activity, the latter develops and functions at different levels of system formation — levels of stages, periods and phases of activity. At the same time, the chronological framework of the normative levels of general education does not always coincide with the chronology of the systemogenesis of the student's educational activity" [14].

Thirdly, it is possible to evaluate the proposed structure of educational activity only from the standpoint of the general psychological functional structure of activity, primarily labor activity [4].

Fourth, D.B. Elkonin correctly shows the need to separate the topic of the lesson and the purpose of the lesson and points out the need to set before the student "... an educational goal as a way of action that needs to be learned." But due to the importance of the purpose of the activity, it is necessary to separate it into a separate component of the structure of educational activities. Our observations show that it is in this nodal link of activity that teachers experience great difficulties.

Fifth, serious doubts should be expressed about the evaluation operation. According to the definition of D.B. Elkonin, the action of evaluation is an assessment of "... the degree of assimilation of those changes that have occurred in the subject itself" [21, p. 219]. "Evaluation becomes a key point in determining how much the educational activity implemented by the student has an impact on himself as a subject of activity" [21, p. 219].

Indeed, the implemented educational activity (as well as other forms of activity — playing, labor) is a source, a determinant of the development of the subject of activity. But this relationship is revealed in the psychological analysis of activity.

The relationship between the internal and external sides of activity is revealed in the process of a special psychological study of activity. And therefore, the operations of assessing the degree of development of schoolchildren as a result of educational activities, the degree of changes that have occurred in the subject itself, are hardly available outside of special study. But they must necessarily be included in the teacher's ideas about the pupil's educational activities.

If earlier in the section "Subject action" we showed the meaning of distributed action, then to even greater extent this is manifested in the joint educational activity of a teacher and a student [15].

Next let us try to look at individual educational activities from the perspective of the general structure of human activity.

Systemogenetic approach to the study of activity

We studied the process of teaching working professions from the late 60s to the late 70s of the XX century. Our ap-

peal to the issues of the psychological theory of industrial training was determined by the urgency of the problem of improving the training of qualified workers and improving the quality of labor. Our work began in the laboratory of labor psychology, labor training and education was created at Yaroslavl Pedagogical Institute by the decision of the Ministry of Education of the RSFSR in 1964.

The methodological and theoretical basis of the work were fruitful concepts of activity and methodological approaches to its study, which were developed in Russian psychology [4; 8; 9]. The systematic approach in psychology was the second source, which had being formed at that time.

Finally, the third source was the research of the author and his students related to the psychological analysis of working professions for the purpose of professional training: operators of sorting slides on railways, assemblers of semiconductor devices, grinders, operators, universal turners, manual arc welding welders, tire collectors, gluers of rubber products.

Separately, it should be noted the work on the systemogenesis of functional systems of various levels, carried out at the school of the outstanding Russian physiologist Pyotr Kuzmich Anokhin, and, above all, the general architecture of the functional system proposed by him and justified in all components, which is the basis of a "conceptual bridge" between the levels of system and analytical processes [1, p. 46].

Analyzing the work on the system approach, P.K. Anokhin made a fundamental methodological conclusion about the decisive role of the result as a system-forming factor. At the same time, he emphasized the unity of need and purpose. Anokhin wrote: "The peculiarity of the biological system is that the need for some useful result and the goal of obtaining this result ripen inside the system, in the depth of its metabolic and hormonal processes, and only after that, through nervous "drive belts", this need is realized in behavioral acts that allow to some extent mathematical formalization" [1, p. 29].

Based on his ideas about the formation of biological systems, P.K. Anokhin introduced the concept of systemogenesis in 1937, the which laws were further developed for a long period.

The process of systemogenesis is realized on the "basis of heterochrony in the bookmarks and rates of development and in the moments of consolidation of these structures throughout embryonic development" [1, p. 278].

Based on the above statement, we, first of all, tried to develop a universal structure of activity in developing a systemogenetic approach to vocational training, The following principles of activity study were used as a basis.

— *The principle of objectivity*, according to which, it is necessary to proceed from the analysis of the result of activity during studying activity, as a system-forming factor, the conditions of activity and the process of activity that leads to a normative result.

– *The principle of unity of consciousness and activity*, which involves the study of activity as a conscious reality. Awareness of activity acts as a condition for considering it as a whole.

– *The principle of unity of activity and experience*, which allows you to reveal the moments of activity that are significant for the subject, connects activity with motivation and personal meanings, with the inner world of a person.

Taking into account the stated approaches and principles of psychological analysis of activity, a general architecture of the psychological system of activity has been developed and included the following components:

- motive of professional activity;
- purpose of professional activity related to the result;
- result of activities and individual actions;
- activity program;
- information basis of activity;
- decisions taken in the activity;
- subsystems of professionally important qualities, primarily the abilities of the subject of activity;
- reflection of the results.

A detailed description of each unit of the system is given in works [18; 19].

The approach to educational activity through psychological analysis of work activity was comprehensively justified by Vasily Vasilyevich Davydov. As a result of the philosophical and psychological analysis of the concept of the theory of developmental learning, V.V. Davydov showed that “... the concept of activity can be the initial abstraction, the concretization of which will

allow creating a general theory of the development of people’s social existence and various private theories of its individual spheres”, that “... activity should be understood as a form of historical cultural creativity” [4, p. 15], that it is advisable to begin the construction of theoretical psychology with the concept of activity [4, p. 19], that it is necessary to put “... labor activity in all historical forms of its development and build on this foundation all the diversity of other socially significant activities” [4, p. 29] into the foundation of the classification of various types of activity.

This is exactly the logic we followed by developing educational activities in our research. According to V.A. Mazilov and Yu.N. Slepko, this approach “... is not only applicable to the analysis of various types of educational and pedagogical activities, but also opens up wide opportunities for the organization of interdisciplinary psychology” [10, p. 150].

What does it mean to teach a child to learn?

Currently, it has become an axiom that one of the main tasks of the school is the task of “teaching a child to learn”. But what is behind this expression? This means to form the child’s “competencies” that will allow him to master the educational material offered to him in various forms. What are these competencies (generalized methods of action)? We will get the answer to this question if we turn to the general architecture of the psychological functional system of activity. In the form of a formal model, these competencies are presented in Figure 2.

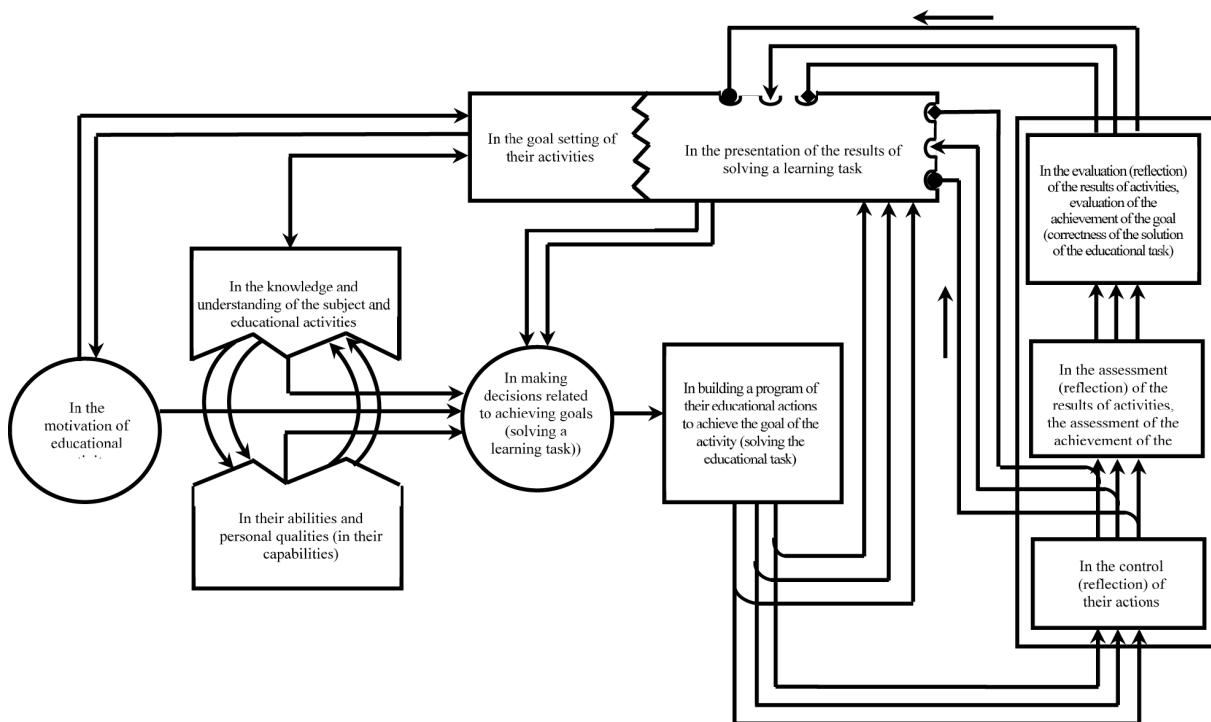


Fig. 2. Student’s competencies in the structure of educational activity

We can say whether we have taught the student to learn or not only on the basis of the diagnosis of these competencies. Here is the question arising: is the teacher ready for the formation of these competencies? The answer to this question is beyond the scope of this article.

Conclusion

In this article, an attempt is made to help the teacher to comprehend the psychological category of educational activity. On the one hand, educational activity (teaching) has its roots in the interaction and mutual interaction of a child and an adult all the way from birth to school. This is the way of objective knowledge

of the world. It is characterized by visibility, the possibility of imitation, reliance on the natural curiosity and motivation of the child. He fits into the life of a child, and the knowledge that he receives refers, in the words of V.P. Zinchenko, to “living” knowledge, to everyday concepts and their connections. But, on the other hand, due to the naturalness of behavior, its structure remains unreflected, hidden from the adult and the child himself. And the teacher will have to make the secret explicit, conscious. And for this, he must clearly understand both the psychological structure of educational activities and the competencies that should be formed in the student (see Fig. 2), and the difficulties that may arise in the way of its development by the child in the learning process.

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The Genesis of the ‘Animation Complex’ Concept in the Historical-Cultural Psychology

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The animation complex is a child development milestone widely used in historical-cultural psychology. However, the emergence of the animation complex concept predates the emergence of cultural-historical psychology. This paper is a narrative review whose main objective is to recover the genesis of the concept of the animation complex and the process of linking and appropriation of this by historical-cultural psychology. Bibliographical research was carried out on the publications from 1960 to 2021, from which a difference between its uses in reflexology and historical-cultural psychology was deduced. Starting from the centrality of this construct for development research, we sought to reconstitute the genealogy of this concept from the rescue of these different conceptions of complex animation.

Keywords: child development, child psychology, developmental psychology, infant, neuropsychology.

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Генезис концепции «комплекса оживления» в историко-культурной психологии

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Комплекс оживления — это веха детского развития, широко используемая в историко-культурной психологии. Однако возникновение концепции комплекса оживления предшествовало появлению культурно-исторической психологии. Данная статья представляет собой нарративный обзор, основной целью которого является восстановление генезиса понятия комплекса оживления и процесса связывания и присвоения его историко-культурной психологией. Было проведено библиографическое исследование публикаций с 1960 по 2021 год, из которого было выведено различие между его использованием в рефлексологии и историко-культурной психологии. Исходя из центрального значения этого конструкта для исследований развития, мы попытались восстановить генеалогию этого понятия, объединив различные концепции комплекса оживления.

Ключевые слова: развитие ребенка, детская психология, психология развития, младенец, нейропсихология.

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Introduction

In the history of science, influential theories, and concepts, sooner or later, acquire a life of their own and are gradually disconnected from their first author. Sometimes, especially in the case of complex theories and concepts, their new life (or lives) can also become detached from the original theory. It is worth noting that the changes theories and concepts undergo may

differ from the originals. Deviation from old theories is not a problem because new evidence and more elaborate conceptualizations about the phenomena studied provide bases for modifying older approaches [1].

The historical process, inherent to the different nuances of a construct, emphasizes the importance of rescuing its genesis since such dynamics reveal how much they are alive and dialectically result from clashes with other concepts, with new contexts, acquire new clothes,

without letting the past be erased. In this essay, the conditions in which the concept of 'animation complex' (AC) emerges in Soviet psychology and, more specifically, in the cultural-historical approach are explored.

According to Zaporozhets [2], the concept of AC is part of Russian pedology and reflexology studies, more specifically, based on research carried out in the 1920s by Figurin and Denisov and coordinated by Shchelovanov. This researcher's laboratory was dedicated to the comparative study of the ontogenesis of behavior, and most of the investigations studied the first appearance of conditioned reflexes [3].

The sample for these surveys consisted of children from zero to three years of age residing at this Institute, making it possible to conduct systematic observations over 24 hours a day. The analysis of these observations, among other discoveries, led the team to circumscribe the concept they called AC [*kompleks ozhivleniia*] or animation syndrome (positive emotional syndrome), as published in 1929 in the book "Stages in the Development in Child Behavior from Birth to the Age of One Year" by NM Shchelovanov, NL Figurin and MP Denisova [3].

According to Kistiakovskaia [4], in this seminal work, the concept of «AC» refers to a set of actions that the baby manifests in response to the interaction with their caregivers. For this author, the appearance of these responses is of great significance for children's neuro-mental and physical development. In favorable conditions for development, positive emotions should appear at the end of the first month of life. Gradually, over the next two months, expressive movements appear that correspond to the CA, including: « smiling, quick and animated widespread movements with repeated straightening and bending of hands and feet, fast breathing, vocal reactions, eyeblink, etc." [4, p.39].

From the characterization described above, initially, the AC concept was configured as an indicator of the development of babies of a reflexological and pedological nature. However, this construct is later identified in the literature of historical-cultural psychology and neuropsychology when several authors, in different decades, address the development of the first year of life [5; 6; 7; 8; 9].

Vygotsky [10], considered the main founder of the cultural-historical approach, references data from experiments by Shchelovanov when he presents his theory about the development of babies. However, he interprets the results from his perspective of ontogenetic development; therefore, he makes critical considerations about Shchelovanov's interpretation, as well as the conception of child development advanced by the reflexological perspective, as expressed in the following excerpt:

«By its very essence, this theory does not serve to explain these aspects of development since it ignores, on the one hand, the development of the child's psyche and, on the other hand, interprets the development of the child's social interrelationships, based on the point of view of the law of the relationship between the organism and the physical environment. Therefore, he inevitably reduces the higher laws to the lower ones and interprets development mechanically. His mechanism manifests chiefly in failing to

understand the difference in principle between the child's social and animal development.» [10, p. 28].

In the text «*The methods of reflexological and psychological investigation*», Vygotsky [11] reinforces this understanding of reflexology, pointing out that it is characterized as idealist when it splits the psychic and the reflexes in its experiments. For the author, when reflexology excludes psychic phenomena, considering them as something that is not within its competence, it acts similarly to idealistic psychology, which studies the psyche independently of the body and the social context in which the subject is immersed. Studying human behavior without the psyche is as fruitless as studying the psyche without behavior. In this sense, Vygotsky emphasizes the need for psychology to overcome axes of the tension inherent to its emergences, such as mind and body, nature and culture. The conception proposed by the author breaks with such dilemmas and proposes a dialectical psychology in which such axes need to be considered at the core of cogensis.

On the other hand, Vygotsky had a strong connection with pedology, a science to which Shchelovanov also contributed. However, despite also being a pedologist, Vygotsky does not mention the term AC in his publications or even mentions this indicator of development using another term. This concept will only appear in the future in the context of Historical-Cultural Psychology (HCP) after Vygotsky's death, being initially cited by Elkonin [5] and Lisina [6].

From the panorama presented, a time gap and a conceptual turnaround are identified, with questions about why, when, and how the concept of AC is incorporated into the historical-cultural approach. The recovery of this epistemic turn emerges as a challenge, that is, the point of becoming, the incorporation of the concept derived from reflexology, and the transformations that emerged from this process.

Considering the problematization above, this essay aims to build a narrative for the genesis of AC, exploring the relationships between this concept in its beginnings, psychology, and historical-cultural neuropsychology. To do so, it traces a historical path of child psychology in Russia and summons the conceptions of development presented by different researchers of the historical-cultural approach.

The publications were selected through a bibliographic search in the databases: Pubmed, Web of Science, PsycINFO, and Google Scholar, using the term "animation complex", "infant", and «historical-cultural psychology». In addition, the research was conducted in the scientific journals *Journal of Russian & East European Psychology* and *Cultural-Historical Psychology*, related to the diffusion of research of authors of cultural-historical psychology, as well as in the repository of Moscow University for the consultation of some primary sources. As the publications were analyzed, a search was carried out for the references cited in the texts as a strategy for adding gray literature. In addition, research was also carried out on important concepts and themes for constructing the narrative of the CA's genesis, such as "pedology" and "Elkonin's work", among others.

Child psychology in Russia, the emergence of the CA construct, and the cultural-historical approach

According to Dafermos [12], Soviet psychology is a unique theoretical tradition that emerged and developed during the 20th century in the Soviet Union. Concepts, theories, and approaches that emerged in the context of Soviet psychology (historical-cultural psychology and activity theory) significantly influenced the development of psychology and scientific discussions in different countries.

In pre-revolutionary Russia, idealist tendencies were accompanied by a critical materialist influence based on the natural sciences and associated with the philosophical views of the revolutionaries. Regarding child psychology, before the 19th century, issues were dealt with within general psychology. As an independent branch, child psychology emerged during the methodological crisis of bourgeois science. After the 1917 revolution, research on child development became linked to the socialist state, and theories on child mental development needed to be revised based on dialectical materialism [7].

At the end of the 1920s, the Bolsheviks declared pedology an official science, entrusting it with the scientific management of children's education and health. For pedology, the child was conceived as a specific object of investigation, a human form different from the adult who, therefore, needed new theoretical models and empirical methods of study [13].

However, studies in pedology in Russia started before the revolution: In 1907, for example, Bekhterev founded the Psychoneurological Institute, which led to the creation of the Pedological Institute, where Schelovánov developed his research and proposed the concept of AC. In 1911, the first Congress of Experimental Pedagogy took place in Russia and, in 1927, the first Congress of Pedology in the Soviet Union [14].

In the 1920s, Kornilov and Blonskii began attempts to approach child psychology from the perspective of dialectical materialism, coinciding with the period in which Schelov nov took over the department of the Pedological Institute that investigated the origin of behavior. Subsequently, Vygotsky, Luria, Leontiev, and others began to study the social and historical determination of the child's mental development and the role of social experience in the development of higher mental processes. These previous studies introduced the cultural-historical approach [7; 14].

Under the principles of pedology, between 1922 and 1932, numerous studies were carried out with different psychological approaches, such as reflexology and reactivity, among others. The diversity of approaches resulted from an internal battle, within pedology, between defenders of biologism and sociogeneticism [3].

In 1936, the decree "On pedological distortions in the Narcompros system" was issued, which lasted until the end of the Soviet Union in 1991. The Narcompros was an institution similar to the Ministry of Education. In addition to destroying scientific literature, expulsions, dismissals, and arrests occurred [15]. Whoever used the knowledge of pe-

dology was pointed out as someone who "stopped in time" and could even be condemned to death [14].

When the decree was published, Vygotsky was one of the leading Russian pedologists [15]. For this author, pedology was the science of child development, as it formed the basis for synthesizing different disciplines that studied children. Together with educators, he participated in the efforts to make pedology a means that could achieve the goals of the "new man" during the social restructuring so desired after the 1917 revolution. With the publication of the 1936 decree, Vygotsky was condemned by the authorities, and the study of his ideas was prohibited [14].

However, even with the prohibition of his works (censored between 1936 and 1956), the ideological seeds planted by Vygotsky grew strong enough to found and continue historical-cultural studies, having an underlying theoretical school composed of authors such as Luria (1902–1977), Galperin (1902–1988), Leontiev (1903–1979), Elkonin (1904–1984), Zaporozhets (1905–1981), Davidov (1930–1998) [16].

Elkonin, like Vygotsky, was very interested in pedology, notably children's play. An admirer of Vygotsky's ideas, he approached him around 1931. Since then, they began to work together, Elkonin as his assistant, studying the problems of play in child development. Due to Vygotsky's premature death, this partnership was brief, lasting just over four years. However, this approach was decisive for circumscribing the sphere of interest of subsequent studies of Elkonin, namely, child psychology and pedagogy [17].

The decree against pedology also negatively affected Elkonin; he was dismissed from his post as director of the Leningrad Institute of Pedology, deprived of the doctorate degree candidate, and removed from his professional activities. Sometime later, he began working with first-grade children, and this experience gave him subsidies to develop a study on learning to read and write in school-age children [17].

When talking about Vygotsky, Elkonin [18] always expressed admiration and emphasized the privilege of having been his work partner. This admiration meant that the investigations and works produced by this author were strongly influenced by Vygotsky and placed in the field of historical-cultural psychology. With the death of Vygotsky, Elkonin approached a group of collaborators from the cultural-historical school coordinated by Leontiev [19].

Elkonin devoted himself to theoretical and conceptual work on methodological problems relating to childhood and questions of applications in the psychology of learning, teaching, and education. For this author, the teaching and learning process should adapt to the periodization of psychological development. In this sense, it was necessary to deepen the knowledge on this subject because until then, in the Soviet Union, only Blonski and Vygotsky had studied the periodization of child development [16].

Like Vygotsky, Elkonin resorted to analyzing studies by other researchers – even with approaches far from his own, in this case, Shchelovanov, to carry out inter-

pretations based on his onto-epistemological matrix. However, unlike Vygotsky [10], who only mentions the presence of behaviors that are part of the AC without mentioning the concept itself, El'konin [3] names and recognizes it as an essential indicator of child development. In another text, Elkonin [20, p. 202] speaks again of AC, but this time he is not limited to Shchelovanov's studies and cites Lisina's experiments:

"Lisina and her collaborators (1974) demonstrated the existence in the baby of a particular communication activity that has an immediate emotional form: "the AC," which appears in the third month of life of the child and that previously was considered a simple reaction in towards the adult (which is the strongest and most attractive stimulus for the child), but which in reality represents a complex action due to its structure, whose objective is to communicate with the adult and is carried out through different particular means. It is worth emphasizing that this action appears long before the appearance of the possibility of acting with objects, before the emergence of the act of pressure."

Lisina was a researcher of the cultural-historical approach, a follower of Leontiev, and a student of Elkonin. She carried out studies to understand the development of communication activity in childhood and, during her experiments, also focused on the emergence of AC. Magalhães [21] points out that Lisina was influenced by Elkonin's studies, notably identified when he named the manifestations of babies, participants in his study, with the nickname of AC. In her text Lisina [6, p. 287] refers to Elkonin as the author of historical-cultural psychology that approaches AC to refer to positive emotional manifestations:

"Detailed ontogenetic research of positive emotional manifestations in children testifies that they are formed during the first months of life during communication with close people and under their influence. It refers to smiling (Izard, 1971; Spitz, 1946; Kistiakovskaia, 1970), laughter (Washburn, 1929), expressive vocalizations (Brackbill, 1958; Vétrova, 1975), motor excitement with positive emotional nuances (Lisina, 1974, a). These facts allowed Elkonin (1960) to state that the animation complex fulfills the baby's communication function with the surrounding adults."

For Lisina [6], communication or communicative activity is a mutually oriented activity of two or more people in which each one acts as an active subject. Therefore, it refers to the interaction of people coordinating and joining their efforts to achieve an expected result. Through contact with adults, children assimilate the historical and social experience of humanity and develop the peculiar characteristics of human beings, especially communication, which is considered one of the most important factors for children's psychic development [22].

The author, as mentioned earlier, starts from the concept of activity, developed by Leontiev [23], to classify communication as a type of activity. Like any activity, it is object-oriented, with its object being the companion of the communication activity. In this perspective, communication aims to satisfy a particular human need, which is the desire to know oneself and others, occurring through valuing the other and self-valuing [22].

Communication activity changes with development and, in this sense, Lisina [22] classified four different forms of communication that occur during the first seven years of life, namely: personal-situational communication (first six months of life), practical-situational form of communication (from 6 months to 2 years); cognitive-extra situational form of communication (from 3 to 5 years) and personal-extra situational form (6 to 7 years).

The results of experimental research carried out in the Laboratory of Early Stages of Mental Development of the Research Institute of General and Pedagogical Psychology of the Academy of Pedagogical Sciences of the USSR suggest that the content of communication is an important factor in the formation of a harmonious relationship between a child and an adult. The empirical study conducted by Lisina and Kornitskaya [23] tested the child's attitude to different programs of adult communication with her (I – direct-emotional, II – situational and III – extra situational). All three models were taught by the same adult-experimenter to children of three age groups (first six months of life, toddlers and older preschoolers). The results of the first group showed that infants from zero to six months benefit from all forms of communication, but they become more active and happier with communication program I, that is, with the main activity of this phase (direct emotional dialogue), especially because it includes physical contact with the adult. Thus, the compatibility of the communication content with the child's needs leads to affection and attachment to the adult. The authors suggest that to overcome the crises of childhood, the adult must, of course, constantly restructure the content of his interaction with the child in accordance with the development of the content of the child's need for communication [23].

However, the work of M.I. Lisina did not directly compare the AC in infants under the influence of an adult and under the influence of an object. Despite the presence of this form of behavior in both situations, Meshcheryakov's experiments found that the AC has distinct characteristics in infants when they perceive adult and object influences separately. First, the overall intensity of the AC upon exposure to an adult is greater compared with exposure to objects. Secondly, the composition of the AC for adult stimuli differs from that for object stimuli, the first case presenting significantly more bright smiles and more vocalizations. Finally, when the manner and nature of the adult stimuli changed, there was a reorganization of the infant's animation complex in its composition. Similar changes in the presentation of objects did not alter the expression of the AC [24; 25].

In light of the new findings, obtained by authors from various theoretical perspectives (such as J. Walton, T. Bauer, I. Bushnell, E. Spelke, K. Trevarthen, among others), Avdeeva highlights the characteristics of the infant's spontaneous activity from the earliest stages of development. It has been shown, for example, that babies see the human face and inanimate objects differently. When they look at the face, they make more sounds, start moving their arms and legs, open and close their fists and make fluid movements. K. Trevarthen suggested that two-month-old babies, in interaction with

an adult, already have some sense of their ability to act and have a sense of subjectivity. Thus, this group of authors assumes that the infant has a biologically determined versatile social competence. For this reason, the child's socialization is understood as a two-way process involving both parties. In terms of its content, the process appears as a synchronization of the complex action patterns of the adult and the child [26; 27].

For this review, it is worth detailing the first form of communication, personal-situational communication, the moment in which and through which the AC emerges. At this stage, the baby's main activity is communication with the adult. The interrelationship mediates his relationship with the world with the caregivers, and the baby has not yet mastered his movements nor the gripping movements to grab objects [28]. Thus, although Elkonin was the first cultural-historical author to cite the concept of AC, including influencing Lisina herself, this was the first cultural-historical author who, in her experiments, identified the emergence of AC and deepened the understanding of its manifestation and its role for development [21].

Currently, guided by Lisina's findings, historical-cultural neuropsychology researchers [8; 9] advance in the understanding and use of AC as an indicator of development: they state that, in the assessment and intervention from 2 months of life, professionals and caregivers should be attentive to how communicative activity and AC are expressed, as well as the stimulation of shared adult/baby activities that cause the emergence of this indicator. Moreover, both authors were involved in constructing the only child development assessment instrument published so far that contemplates the process of acquiring the AC [29; 30; 31; 32].

After outlining the historical path of insertion of the AC concept in historical-cultural psychology and neuropsychology – from the emergence of Russian child psychology to the present moment – the next section will address the understanding of this approach on the infant development process and its articulation with the AC concept.

The development process for the historical-cultural approach

Historical-cultural psychology and neuropsychology consider the nervous system's materiality and formation through social interaction as fundamental aspects for understanding the development of the human psyche [33]. In this context, the main law of developing higher mental functions, called the 'law of internalization,' illustrates how such functions appear on two different planes. Initially, they appear on the social and interpsychic plane (mediated by external signs) to, only afterward, be internalized and appear on the mental and intrapsychic plane [34].

The social dimension is the source of development; therefore, the maturation process alone does not guarantee human development; specific experiences within a given culture are necessary. As a social being, outside the

relationship with society, man is incapable of developing specifically human superior qualities and characteristics. Such interdependence of human development concerning culture means that chronological age does not always correspond to psychological age [34].

Therefore, to understand the subject's development level, more is needed to know than his chronological age; it is also important to consider his psychological age. The latter is circumscribed from the periodization of development, classifying the development process into different phases. For Vygotsky [33], periodization should be based on the internal changes that occur during the development process, to the detriment of emphasis on symptoms (indications) or external characteristics. Only the twists and turns of the course of the inner essence of development provide a basis for determining the main periods of formation of the child's personality or the phases and crises that constitute development.

The construction of this periodization starts from the dialectical conception, in which development is characterized as a continuous process of self-movement, with revolutionary passages, evolutions, and involutions, qualitative leaps, and periods of crisis alternating with phases of relative stability. Both periods of crisis and stability are identified by the appearance and formation of the new, which did not exist in the previous stages. The "new" refers to the concept of neoformations, a new type of personality structure and its activity that emerge with the development process. Neoformation is the criterion that distinguishes the periods of child development, as it allows circumscribing the essential to be determined at each psychological age [33].

Within this scenario, pedagogical demands led to the need to understand the driving forces of child psychic development, in addition to describing or mapping this process. Elkonin [35] believed that the periodization of development should be considered from the notes of Blonski and Vygotsky, together with the findings of Leontiev and Rubinstein on the theory of activity. This theoretical body would provide a solution to the problem of the driving forces of psychic development, directly linking it to the question of the principles of division of stages in the psychic development of children.

For Leontiev [28], it is through the activity that human beings act on the surrounding reality to satisfy their physical and psychic needs. In turn, the higher psychic functions are developed in the execution of activities that require them. That is, the psyche develops in and through activity. Over the years, the subject has related to the world in a particular and unrepeatable way, as the psyche changes qualitatively from the relationships established with the social environment [36].

For each development phase, a primary activity triggers the core changes in psychic processes and the psychological particularities of the personality. The main activity is the one that drives and guides development, as it promotes the emergence of new types of activity and neoformations, ascending to the main psychological changes in each phase. Other activities coexist as accessory lines but play a secondary role in promoting development [37].

Taking advantage of this conception of activity, El'konin [35] proposes a developmental periodization model that: 1) overcomes the existing dichotomy in child psychology between the development of motivational aspects and needs and that of the intellect-cognitive aspects; 2) considers the process of psychic development as an upward spiral, instead of linearly; 3) enables the study of existing links between isolated periods and the establishment of the functional importance of every preceding period for the beginning of the following one; 4) divides psychic development into epochs and stages based on the internal laws of this development and; 5) it helps to resolve the question about the sensitivity of some periods of child development to specific influences and focuses on the problem of linkage between the links in the education system.

This proposal considers three main periods of development: early childhood, childhood, and adolescence. In turn, these periods are composed of stages, which have their periodization circumscribed from the main activity for child development at a given stage of life. The main activities, considering their chronological order of development are: emotional communication, object manipulative activity, role-playing, study activity, personal, intimate communication, and professional/study activity. The emergence and predominance of these activities signal the psychological age or stage in a particular development period [35].

To contemplate the objective established in this article, we will focus on the childhood period, notably the early childhood stage, as it is at this time that the emergence of AC is expected. For El'konin [3], although the concept of AC has emerged within the theoretical context of reflexology, the discovery of this development indicator is a precious finding of this historical period.

Infant development for the historical-cultural approach

The process of infant development begins with the critical act of birth, and consequently, the phase that follows is a critical period called the postnatal period. This phase is marked by the transition from intrauterine to extrauterine life. After birth, the baby is already physically separated from its mother; however, due to the peculiar social situation of development, it is still biologically connected to the mother, as it continues to depend on her to satisfy its main vital functions [10].

The baby does not demonstrate the need for communication in the first days after birth. Only at the end of the first month do some components linked to this need begin to be structured, and their final form is reached around two months of life (with 6-8 weeks of life — close to the change in the postnatal period). Only from this moment on is it possible to speak of an activity aimed at adults, who can be considered an object of communicative activity [22].

In the first month of life, the baby's total dependence on the adult makes the latter try to identify and meet all the baby's demands. It is possible to perceive the exis-

tence of pleasant or unpleasant emotional states in the first days of life, especially from the facial expressions and intonation of screams and crying. However, the newborn undifferentiated psyche, emotions, and sensations are merged [10].

Thus, the state of consciousness needs to be more explicit. What is verified are non-differentiated and non-fractionated experiences; these represent a fusion of attraction, affection, and sensation. Furthermore, the psyche cannot separate its existence and experiences from the perception of objective things and, therefore, does not distinguish social and physical objects [10]. In this context, a fundamental law is formulated that regulates the perception of the newborn:

“In the beginning, the amorphous perception of the whole situation sets up a background against which a more or less limited and structural phenomenon stands out for the child, which he perceives as a special quality in this background. The structural law of the separation of figure and ground is, it seems, the most primitive peculiarity of psychic life, the starting point for the further development of consciousness.” [10, p.6].

Based on the research of predominantly German psychologists (Ch. B hler, K. Koffka, W. Stern, G. Hetzer and others), Vygotsky attributes a feature of originality to the mental life of the newborn child. This uniqueness consists in the predominance of undifferentiated and indivisible experiences, representing a type of unity between attraction, affection and sensation [26]. In this way, the baby's initial perceptions are characterized by an indivisible impression of the situation. No difference is made between the isolated objective moments of the situation or the elements of perception and senses. Thus, he reacts to complex emotional nuances and not to isolated or differentiated elements of the situation. In this direction, Vygotsky [10] exemplifies that, in the relationship with his primary caregiver, the baby reacts emotionally to his expressive movements before being able to perceive the shape of his face, color, and other attributes in isolation.

In this context, the first form of genetic communication establishes the child's emotional contact with others. These emotional ties between older children and adults form an indispensable part of the ties that unite participants in the communicative activity. They show the most generalized evaluation of one interlocutor by the other, which is most effectively expressed through expressive mime, a characteristic of situational-personal communication [6].

This form of communication is of great relevance for the general psychic development of the child, as the attention and affection that adults invest in the baby awaken a feeling of joy in him, and positive emotions increase his vital tone, activating all his functions. Personal-situational communication also stimulates the formation of perceptive actions, such as visual, auditory, and other analyzers. These acquisitions will be necessary for the baby's insertion in the subsequent development phase that demands interaction with objects [22].

Initially, the infant presents only the unconditioned reflex of vocal reactions, which is biological with an

emotional function. From the interaction with caregivers, this vocal reaction gradually becomes a conditioned reflex, starting to assume the function of establishing social contact [38; 39].

The pinnacle of this form of communication manifests itself through complex conduct, namely, the AC. For Lisina [6], this includes the behaviors of concentration, eye contact, smile, vocalization, and motor agitation, all in response to interaction with another person. AC components serve as a basis for the baby to initiate some processes, such as distinguishing the adult person from their surroundings (concentration), mimicking (smile) and vocal communication (pre-linguistic vocalizations), and actively attracting the adult to the communication (motor excitation).

Such an acquisition is only possible thanks to the social situation of the baby in the first year of life (which refers to a need of the child in relation to the adult), together with the attitude of the primary caregiver who, in advance, approaches the baby as a subject and actively shapes their behavior. Therefore, it is the adult who attracts the child to communicate through the process of this activity; the need for communication awakens in the baby around the age of two and a half months of life, and it is already possible to verify the emergence of such a need [22].

However, for proper communication, psychic processes are essential that allow the child to become aware that someone takes care of him and, therefore, to react to that person differently than others. Given the above, communicative activity is only expected at this stage from acquiring the neoformation of the postnatal period, namely, the individual psychic life [10]. About this neoformation, Vygotsky reports:

“We believe, therefore, that when determining the limits of the postnatal period, it is convenient to use data that characterize the psychic and social state of the newborn. The data that most coincide with this criterion refer to the child’s higher nervous activity, which is more directly related to his psychic and social life. The investigations of M. Denisova and N. Figurin show that a child’s development changes at the end of the first month or the beginning of the second. The cited authors consider that the symptom of the first period is the appearance of the child’s smile when he is spoken to, that is, his first specific reaction to the human voice. The investigations of Ch. B hler and H. Hetzer show that the child’s first social reactions, which indicate a general change in the psychic life of the newborn, are observed between the first and second months of life. At the end of the first month, the crying, the cry of one child, provokes in response the cry of another child. Between the first and second month, the child’s smile becomes the reaction to the sound of the human voice. All this makes us suppose that we have found the upper limit of the postnatal period, after which the child enters a new age stage.” [10, p. 7].

Recent studies elucidate that the smile in infants can be observed from birth, however, this smile called endogenous, spontaneous, primitive or false, occurs in response to internal stimulation of subcortical origin and

decreases its occurrence over time, being more frequent during sleep. In other words, this type of smile is not a positive emotional response to an experience or feeling of pleasure [40]. The manifestation of the endogenous smile is present in the same age group in different cultural contexts [41].

At three weeks of age, the first exogenous smiles start to be produced in response to external stimulation of the auditory type, whether social or not [40]. In the following week, the baby’s active attention is already directed to the caregiver, through sequences of face-to-face contact. In the nervous system, from the second month of life, the control that was exercised by subcortical regions is now performed by cortical regions [41]. As a result, around the sixth week of life, the exogenous smile also begins to appear for visual stimuli, and gradually, it begins to appear only as a social response, which is why it is also called social smile [40].

For Vygotsky [10], this acquisition marks the overcoming of the postnatal period, as it indicates the achievement of the neoformation of the phase: “individual psychic life”. The psychic life, which Vygotsky refers to, is different from the psychic life of older children or adults since it is mainly related to the subcortical centers and the still immature cortex, structurally and functionally. Therefore, it is impossible to conceive intellectual and volitional phenomena of consciousness at this stage. Nor are there innate ideas and accurate perception (understanding of external objects and processes or conscious aspirations) [10].

At this moment, the change in the infant’s attentional level to internal and external stimuli is evident: more attention is paid to sensory stimuli and movements. It sounds like he or other people produce. Such a change can be perceived through its facial expression, movements, and sounds it emits [10]. From then on, the baby has a powerful combination for its development: an individual psychic life and a higher level of attention and interest in the surrounding environment. Such acquisitions and the main activity provide the emergence of the AC.

The postnatal period is characterized as a moment of passivity and transition in the baby’s behavior and conscience. This situation begins to change from the end of the first month of life and ends with the rise of the neoformation that follows this phase; this is the starting point for developing the child’s personality. The new phase is called the period of receptive interest, and it is possible to overcome the limits of the newborn’s passivity, which is gradually transformed into interest. In this period, there is a reduction in the characteristics of the transition from intrauterine to extrauterine life, and the baby is more awake and interested in external stimuli [10].

Suppose we superimpose the understanding of Vygotsky [10] and Elkonin [5] on infant development to the findings of Lisina [22]. In that case, we will find that the emergence of communicative activity occurs consecutively with the formation of individual psychic life, with AC being the marker physical or visible part of both acquisitions. Initially, signs of the emergence of this neoformation appear, such as the smile in response

to human interaction, and then the other behaviors that form the AC and indicate the presence of communication are expressed.

Summarizing, we should note that the theoretical assumptions of L.S. Vygotsky, according to which the baby is “the most social being”, were validated and further developed in experimental studies of the M.I. Lisina school (N.N. Avdeeva, G.Kh. Mazitova, S.Yu. Meshcheryakova, S.V. Kornitskaya) on the formation of the child’s personality in communication. In this perspective, it was shown that the decisive condition for the child’s mental development is the unique social situation of development, when an adult, when coming into contact with a child, shows in advance an attitude towards him as a person with his unique importance, that is, as a subject of the communicative act. This attitude of the adult towards contact with the child is reflected in the formation of a positive motor self-consciousness, the first pre-personality formation, the essence of which is the child’s experience of himself as a subject of communication and social interaction [26].

In addition, despite not mentioning the term AC, Vygotsky [10] refers to the changes indicated by this development indicator, primarily when he reports that between two and three months of life, the baby goes from a more passive state to one of greater attention. This change becomes perceptible through behaviors such as facial expression (smile is the first of them), movements, and emission of sounds, that is, the components that are part of the AC.

Conclusion

The concept of AC is initially incorporated into the theoretical-methodological corpus of cultural-historical psychology, considering the findings of studies carried out by Russian reflexology researchers. Vygotsky analyzes experiments by Shchelovanov’s team, including his conception of the infant’s development and the appearance of behaviors that are part of that list that circumscribes the AC. However, it does not name or use this concept, referring only to the behavioral expressions that characterize it.

Vygotsky indicates critical developmental changes between the second and third months of life, resulting from the emergence of the neof ormation of “individual psychic life.” This acquisition marks the transition from a period of passivity (postnatal crisis) to one of greater receptive interest (first stage of the first year of life). According to the author, it is possible to observe this

change through the presence of facial expressions, movements, and sound emissions, which are integral components of the AC according to the definition of Elkonin and Lisina.

Elkonin introduces, in a pioneering way, the concept of AC in the cultural-historical approach. For the author, AC would arise due to the main activity of the childhood stage, namely, direct emotional communication. Later, influenced by Elkonin and the findings of her experiments on the development of communication activity, Lisina reinforces the importance of AC as an indicator of development. For the author, AC is the most sophisticated expression of the main activity, the personal-situational communication activity.

In her studies on the development of the communicative activity, Lisina identifies the centrality of the personal-situational communication activity for the development of positive emotions, which raise vital tones and activate all functions, contributing to the formation of perceptive actions. For this author, the indicator that the baby is at the peak of this communicative way is the manifestation of AC. Currently, neuropsychologists from the historical-cultural approach continue to use this indicator to assess and intervene in the development of infants [30; 42; 43; 44].

Considering the historical path presented, it is concluded that, even without a direct citation of Vygotsky on AC, this concept has acquired importance within the historical-cultural approach; therefore, it can be considered an indicator of the infant’s development for this approach. This concept, in addition to pointing to the presence of communicative activity, reflects the acquisition of neof ormation-individual psychic life and the passage from the period of postnatal crisis to the period of receptive interest and the childhood stage.

In the present article the genesis of the term of CA in HCP is discussed, however this construct also has great practical importance for early childhood education. In line with Mescheryakov’s position [24], for the proper development of children in the first months of life and in the context of their care, it is not enough just to place a toy within their reach, a practice that still happens in some kindergartens and homes. At this stage, it is much more important that the caregiver has close and frequent affective contact with the baby. The adult should also go beyond satisfying the child’s basic organic needs and make emotional contact with her, aiming for synchrony in the communication process, participating in her formation as a subject and encouraging her to be active, something that no one but the adult can do.

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Play Support Strategies of Preschool Teachers with Different Perspectives on Play and Its Role in Child's Development

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The recognition of play importance does not always lead to the creation of good conditions for its development. An attempt to turn play into classes, to use it for teaching, leads to the disappearance of spontaneous play from kindergartens. There is a gap between the declared pedagogical aim and real practice. This may be due to understanding the key features of play and its role in child's development. The purpose of the study is to study what criteria teachers use to distinguish between play and a pseudo-play, how the understanding of play is related to the strategy of its support. Structured interviews, including commentary on 2 videos, were conducted with 34 preschool teachers. The assessment of the conditions for play development was carried out using the scale "Play Environmental Rating Scale" in 28 preschool classrooms (13 kindergartens). The average total score is 3,35 (sd=1,31; med=3,43), which corresponds to the minimal quality level of conditions for play. Key deficits are the participation of the teacher in joint play with children, the provision of conditions for multi-age interaction. Significant differences are revealed in the strategy of play support among teachers with a contrasting understanding of the pseudo-play video. Teachers who distinguish between play and pseudo-play and emphasize the developmental value of spontaneous children's play create a multifunctional play environment and more often participate in joint play as partners. Teachers who do not distinguish between a play and a pseudo-play are more often too didactic or outsiders, they create a realistic play environment. The results of the study can be used in elaboration of programs for teacher's professional development.

Keywords: preschool age, play, quality assessment, play support, play environment.

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Стратегии сопровождения игры у дошкольных педагогов с разным пониманием игры и ее развивающей ценности

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Признание педагогами важности игры не всегда приводит к созданию условий для ее развития. Попытки превратить игру в занятия влекут за собой исчезновение спонтанной игры из детских са-

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дов. Происходит разрыв между заявляемой педагогической задачей и реальной практикой. Это может быть связано с непониманием ключевых особенностей игры и ее роли в развитии ребенка. Цель исследования — изучить, какими критериями педагоги пользуются для различения игры и псевдоигры, чем отличаются стратегии сопровождения игры у педагогов с разным пониманием. Интервью, включающее комментирование двух видео, были проведены с 34 дошкольными педагогами. Оценка условий для развития игры проводилась с использованием шкалы «Поддержка детской игры» в 28 дошкольных группах (13 образовательных организаций). Средний балл составил 3,35 (sd = 1,31; med = 3,43), что соответствует минимальному уровню условий для игры. Ключевые дефициты: участие педагога в совместной игре с детьми, обеспечение условий для разновозрастного взаимодействия. Выявлены значимые различия в стратегии сопровождения игры у педагогов с контрастным пониманием видео псевдоигры. Педагоги, различающие игру и псевдоигру и подчеркивающие развивающую ценность спонтанной детской игры, создают полифункциональную игровую среду, чаще включаются в совместную игру как партнеры. Для педагогов, не различающих игру и псевдоигру, характерны отстраненная и дидактическая позиции, реалистичная игровая среда. Результаты исследования могут быть использованы для разработки программ профессионального развития педагогов.

Ключевые слова: дошкольный возраст, игра, оценка качества, сопровождение игры, игровая среда.

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Introduction

In preschool practice, a contradiction is becoming more and more apparent: the Federal State Educational Standard defines play development as a target, teachers recognize its value [14], at the same time, the turn towards the predominance of organized school-like activity over free activity continues [3; 12]. Directive pedagogy, over-organization of the life of preschoolers, a shift in focus from the development of universal abilities to knowledge acquisition cause the replacement of spontaneous play by pseudo-play and have a negative impact on child development [10; 16; 20]. At the same time, organization of play environment is very popular issue among teachers: new manuals are published, teachers share the results of their work on the network, and they spend a lot of effort on creating realistic play attributes and thematic play corners. However, all this works both against the child and against the teacher, taking time and effort, strengthening the illusion of the existence of play practice. An attempt to turn children's play into adult-led activities, to exploit it for learning, leads to the primitivization of children's play [4; 11; 21]. This may be due to the adults' distorted understanding of play development and teachers' role in its support. The more primitive play the teacher observes in the group, the more he/she wants to complicate and enrich it (that is, to perform the traditional role of the teacher). There is a gap between the declared pedagogical task and real practice, the development of spontaneous play can be blocked. To overcome it, it is necessary to study how teachers understand children's play and pseudo-play, the value of play for children's development, as well as the conditions for play development that are created in kindergartens. In a survey conducted 6 years ago, teachers were asked to assess three videos in terms of the adequacy of the play

setting to key features of child development and comment on their choice [13]. Most of the Teachers assessed the pseudo-play highly, with single high ratings for videos of spontaneous play. The existing problems with play support in preschool can be associated precisely with a undervaluation of play, a shift in priorities to the secondary educational tasks in relation to play itself. However, this study did not analyze the real conditions for the play development in classrooms and the sample was not controlled.

Our recent study [14] showed that teachers recognize the value of play, but understand it differently, while the conditions for play support in two clusters of teachers with different views on play did not differ significantly (preschool classrooms were contrasting in terms of the quality of play support). Recognition of the value of play may underlie opposing strategies to its support or, conversely, an outwardly similar strategy (outsider position). This may be due to the fact that teachers recognize the importance of play, but imbue different meanings into its definition.

In this study, we focused on the criteria teachers use to distinguish play from pseudo-play, as well as understanding the role of play in child development and its relation to the quality of play support.

Understanding of play

We consider the imaginary situation as the criterion of play. An imaginary situation is a divergence between the semantic and real fields [1; 4]. The key characteristic of play is double-subjectivity, that is, the ability of the player to be both "inside" and "outside" of play (to play and control the play course). By a pseudo-play we mean an activity that resembles play only in its external

form, but in fact is not play. The key features of a pseudo-play are external goals, a ready-made scenario, directive interaction and the lack of children's own subjectivity (agency). Unlike a scenario, an imaginary situation belongs to the child him/herself, is created by him/her, and is not imposed from outside. Spontaneous play does not require to be spectacular, artistic, or completed. Spontaneous play is a movement in the semantic field of the child, the process of playing is crucial, and not the final result, which is mandatory in the case of pseudo-play.

Play support may be indirect or involve an adult participating in joint play. The teacher can take different positions in joint play: outsider, didactic organizer, supporter (or partner) [9; 15; 17; 21]. The ability to take a partner position implies a balance of child-adult initiatives in play (two-sided interaction), respect for the child's play ideas, improvisation, a good level of adult play. Partner position constitutes teacher's play competence and contributes to play development [8; 9; 21; 22]. At the same time, this is the most difficult position for a teacher, especially if the didactic position is more familiar to her/him [15; 18]. It is necessary to study the factors that maintain the sustainability of changes in the pedagogical position (from didactic to partner) and allow teachers reflect on their strategies on play support.

We consider play support strategy as the conditions that the teacher creates for play development. The educational environment of the preschool classroom (space and materials for play, play-time and transitions, support of peer interaction and adult-child interaction) does not arise by itself, but is created by the teacher on the basis of his/her perspectives on children's play. Play support strategy can be associated with distinguishing between play and pseudo-play and understanding its value for child development.

The research aim is to study how teachers understand play and what criteria they use to distinguish between play and pseudo-play, how the play support strategies differ among teachers with different perspectives on play.

Research hypotheses:

1. Teachers with different perspectives on play (including different criteria for distinguishing play and pseudo-play) use different play support strategies. Teachers who distinguish between play and pseudo-play, who highly appreciate the developmental potential of play, create conditions of higher quality for the play development in their preschools. They more often participate in joint play and take a partner position.

2. Spatial and material aspects of play environment as well as time for play will show less deficits than the indirect play support and adult's participation in joint play.

Methods

The study was conducted in 2022. The quality of educational environment was assessed with the «Play

Environment Rating Scale. ECERS-3 extension (PERS)» [6; 7]. Trained experts conducted a three-hour structured non-participant observation (5 experts participated in the study, interrater agreement – more than 80%). The scale was elaborated on the basis of the principles of developing quality assessment with the focus on the conditions for the development of a mature play, the complex play support, in which the playing adult is a mediator in the transfer of play culture and a partner. The scale assumes a 7-point quality score: 1.00–2.99 mean inadequate quality level (serious risks for play development); 3.00–4.99 – the minimal level of quality (no serious risks, but teacher doesn't pay special attention to the play development, the conditions for play are provided according to the "residual principle" or accidentally appear); 5.00–6.99 – good quality level (regular complex play support); 7.00 – excellent level (expansion of opportunities for mature play development).

The structured interview included the analysis of two contrasting videos. The videos were selected with the participation of 5 experts, who simultaneously evaluated the initially proposed 4 videos as play or pseudo-play (the criterion of play is an imaginary situation). For the study, 2 videos were selected, unanimously rated by experts as play (Video 1) and pseudo-play (Video 2). The duration of both videos is approximately the same (no more than 2 minutes 30 seconds), they were filmed in a «

The interviewer sequentially showed both videos to the teacher. Videos were presented without titles and additional comments. After watching each video, the teacher was asked to answer the question «Do you think this is play? Why? ». After watching two videos, the question «How do these activities in the videos contribute to child's development? » was asked.

The interviews were recorded on a voice recorder and then transcribed. The study participants gave their voluntary consent to the quality assessment and interview, at any time they could refuse to participate in the study. All data has been anonymized.

Sample

The study was conducted in 13 educational organizations in Moscow. In order to ensure sample variability, 8 state organizations from different administrative districts and 5 non-state organizations were selected (among them, an extra-budgetary preschool group is represented in equal proportions – a resource center at the university, a commercial organization, a charitable organization, an autonomous non-profit organization, a family center).

Play support quality assessment was carried out in 28 preschool classrooms (of which 3 mixed-age classrooms) implementing various educational programs: 16 of them work according to the program 'Ot rozhdeniya

do shkoly' [From Birth to School] (4 according to the traditional version, 12 according to the innovative version, in which the emphasis is declared on the value of free activities of children in the structure of the day), 3 under the program "PRODETEY" [ABOUTCHILDREN], 9 implement author's programs developed by teachers (2 of them are aimed at developing creative thinking with attention to play as a leading activity in which it can develop, 2 – on approach "Play pedagogy" with the integration of children with disabilities into groups of normotypical children, 5 – with the priority of free activity for the formation of child subjectivity and the development of play). The ratio of programs can be considered typical in relation to a cluster with an unknown quality of conditions for the play development and predictable in relation to a cluster with an assumed higher quality of conditions in relation to the previously identified quality of conditions [14]. The number of children from 3 to 7 years old on the list in classrooms varies from 9 to 37, the average value is 27 (median 28.5). An average of 14 children were present during the examination (range 3 to 30, median 13). The number of children with disabilities is from 0 to 7 (median 0).

Interviews were conducted with the participation of 34 teachers working in the preschool classrooms from our sample. The majority of teachers (41.2%) have working experience from 3 to 10 years; 26.5% – from 11 to 25 years; 14.7% – less than 3 years; 5.8% – over 26 years old. The majority of teachers have higher education (67.6%): 29.4% are qualified in psychology and pedagogy, 11.8% have a master's degree in pedagogy or educational psychology. The rest of the teachers have secondary vocational or incomplete higher education. 11.8% of teachers attended advanced training courses, in-service trainings and seminars on play support.

Results

The table shows the results of play support quality assessment.

Most items, except for 5 and 7, are at the minimal quality level, the range of scores is quite large (from 1

to 6 and even 7). In the first four items, the median indicates that at least half of the sample got no more than 4 scores, which, although it demonstrates the minimal level of quality, indicates the presence of signs of the good quality level. The spatio-temporal component and the teacher's help to children in organizing space and materials for play, supporting interaction between the players are generally more favorable in the sample than the last three aspects – adult's participation in play (at least half of the sample does not exceed the score of 2.5), peer interaction in play (the middle of the ordered series of values accounts for 3 points) and mixed-age play and interaction (the lowest score of the median is 2 – in at least half of the classrooms conditions are critically insufficient for play development).

Upon a more detailed examination of the results, it is noted that the items "Adult's participation in play" and "Mixed-age play and interaction" are deficient (the mean score for them is below 3 points). An analysis of the scale items reveals the presence of the following deficits: the adult does not give enough time for the children to unfold their play ideas, does not play as a partner from the role, and imposes his didactic tasks on the playing children. Also, a group of indicators of item 5 makes it possible to distinguish each of the positions of an adult's play support: 1.1 and 3.1 – an outsider position; 1.4 and 3.3 – didactic position, 5.1, 5.2, 5.3 – partner position. An analysis of the sample data shows that an outsider position is the most popular. In a quarter of the classrooms, a didactic position was observed, in half of the groups – two-sided interaction between an adult and children in a joint play, which characterizes a partner position.

Interestingly, even in groups with a higher quality of conditions for the development of play, there are typical deficits associated with the level of play development of the adult him/herself (no metacommunication and change of positioning in play (inside and outside of play), low level of role play). There was also a lack of evidence that children have the opportunity to communicate and play with children of a different age in terms of the conditions for mixed-age interaction and play.

The strengths of most groups are that children have space available for their play, at least a minimum

Table

The results of play support quality assessment (Play Environment Rating Scale. ECERS-3 extension (PERS))

PERS items	Mean	Standard deviation	Median	Minimal score	Maximal score
Total score	3,35	1,31	3,43	1,29	6,00
1. Space and equipment for play	3,75	1,51	4	1	6
2. Time for play and transitions between play and other activities (starting/ending play)	3,64	1,73	4	1	7
3. Play materials	3,32	1,79	4	1	7
4. Indirect play support	3,68	1,36	4	1	6
5. Adult's participation in joint play	2,86	1,82	2,5	1	7
6. Peer interaction in play	3,61	1,5	3	1	7
7. Mixed-age play and interaction	2,57	1,55	2	1	6

amount of time for play (at least 25 minutes in total) in the morning (first half of the day) when they are most active, and some materials for play, including a small number of unstructured materials. Higher quality groups (with a total score of 4 or higher) are characterized by a greater variety of unstructured materials and materials for transforming space indoors and outdoors, large and continuous uninterrupted periods of time (1 hour or more) for play, as well as flexible planning of the day, taking into account interests of playing children. In classrooms of higher quality, the adult more often joined play from a partner position, developed two-sided interaction with the children.

The analysis of two contrasting videos made it possible to reveal the peculiarities in distinguishing between the genuine play and the pseudo-play by preschool teachers. Video 1 was categorized by most (except two) teachers as genuine play, using criteria such as child involvement, enjoyment, and activity. However, ratings for this video varied. Some of the teachers in their assessments relied on the importance of the children's emotional experiences (*perezhivanie*), their own play ideas. These teachers also mentioned the children's idea, imagination as criteria. For example, T13 (T – teacher) noted: “Here you can see that this is play. The idea belongs to children, they are involved, emotions, everything is so genuine, a live play, children are interested, involved. They live through their own play.” These teachers emphasized the developmental value of spontaneous play and noted that it is in such play that children develop their imagination, emotions, communication with other children, and self-regulation. Another part of the teachers, noting that there was play on Video 1, nevertheless rated it as pampering or a low level of play. For example, T22: “For children, probably, it’s a play, it’s rather pampering. Well, it’s a play, because they seem to be swimming, looking, this is ... There is a moment of play, and there is a moment of entertainment. Of course, children need to move and jump<...> They don’t save anyone, they just stupidly indulge with rope. Again, teacher shouldn’t stop it, sometimes children need such pampering”.

Strong differences between teachers appeared in the evaluation of Video 2. The answers of teachers can be divided into two clusters. Teachers from cluster 1 (n=19) pointed out that in video 2 there was no play, but theatricalization, a scenario played out, actions according to an adult's instructions. As criteria, they pointed to the constraint of children, orientation to an adult, a sense of a pre-prepared scenario, excessive realism of play attributes and children's actions with them. It is important to note that all teachers in this cluster rated Video 1 as a spontaneous play valuable in terms of child development.

At the same time, teachers from cluster 2 (n=15) emphasized that Video 2 also has play, but even more developed and complex than play in Video 1. As criteria, they used the plot, the presence of play attributes,

and artistry. Let's quote T23's comment on Video 2: “Play, of course. Another level of play. A play in which there is already knowledge about, let's say, a cafe, what kind of pizza exists, how a waiter behaves in a cafe, that is, such a different level of play”. That is, they, unlike the teachers of cluster 1, did not contrast the two videos, but compared them with each other in terms of the level of development of play and educational opportunities. In their opinion, Video 2 has a relatively large developmental potential: in Video 1, the motor sphere develops, children relax, have fun, and in Video 2, children gain knowledge about cafes, pizza recipes, professions, they learn rules of behavior in public places, politeness, vocabulary, artistry; sociability and self-regulation develop.

Next, a statistical analysis of differences in play support strategies among teachers of two selected clusters was carried out based on the Video 2 score (the Welsh's t-test and the Mann–Whitney U-test). Significant differences (at the level of $p < 0.001$) were revealed in the play support strategy among teachers with a contrasting understanding of Video 2 and its developmental value for children, both in terms of the total PERS score and in each item's score (see Fig.).

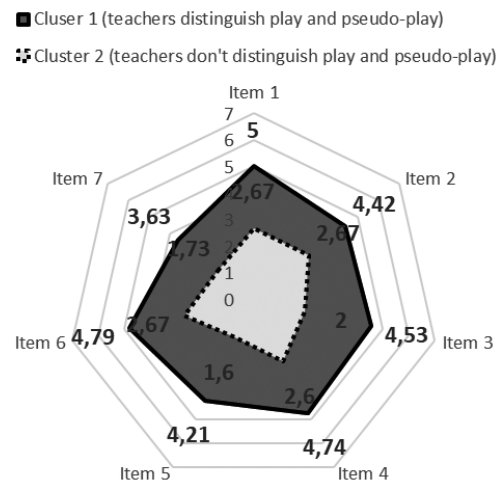


Fig. Comparative diagram of the average scores of two clusters by PERS items (Item 1 – Space and equipment for play, Item 2 – Time and transitions between play and other activities, Item 3 – Materials for play, Item 4 – Indirect play support, Item 5 – Adult's participation in joint play, Item 6 – Peer-interaction in play, Item 7 – Mixed-age play and interaction)

Preschool teachers who distinguish between play and pseudo-play and emphasize the developmental value of spontaneous children's play create more conditions for play development in their preschool classrooms: there is more time for play, unstructured materials and materials for space transformation are available, they support the use and transformation of space for play according to children's own play ideas, they more often participate in joint play as partners and support the interaction of children, including those of different ages, even in single age classrooms.

Discussion

The analysis allows us to conclude that the first hypothesis is confirmed and the second one is partially confirmed. Play support strategies among teachers with different perspectives on play are different.

Teachers who distinguish between play and pseudo-play (they use more play-specific criteria: children's own play ideas, imagination), create a more loose, multifunctional play environment that helps the child act in the semantic field, provide more uninterrupted time for play. These teachers more often participate in joint play and take a partner position. Moreover, among these teachers there were those who consciously join play, and those who play only after all the classes, according to the residual principle, doubting the correctness of their pedagogical actions. The common deficit of teachers in this cluster is the low level of their own play development: teachers provide two-sided play interaction, but so far rarely act as mediators of play culture transfer.

Teachers who emphasize the developmental value of pseudo-play and do not distinguish between play and pseudo-play (they use broad criteria: pleasure, activity, involvement) create a realistic environment that leaves the child in a real field. Spontaneous children's play is perceived by them rather as entertainment, pampering, a low level of play, which is reflected in the structuring of the program: in these groups, the time for play is too fragmented (short breaks between classes) and does not exceed 25 minutes. In play support they often took an outsider or didactic position. This highlights the need to develop programs for teachers' methodological support, including training in reflective play observation; creating conditions for pedagogical reflection and development of adult's play [4; 15].

Interestingly, it was the video of the pseudo-play that was assessed differently by the teachers with different play support strategies. Most teachers correctly assessed the video of spontaneous play (the criteria they used varied). Unlike the results of earlier studies [13], we cannot argue that the majority of teachers highly appreciate the developmental value of pseudo-play. In our sample, one of the cluster was characterized by an emphasis on the developmental value of spontaneous play and a clear distinction between play and pseudo-play. The differences between clusters in play support strategies may be associated with a widespread mistake in understanding play. L.S. Vygotsky pointed out that play is a creative transformation of experienced impressions, and not their recollection or direct reproduction [1]. If a child's play is understood by a teacher as copying reality, then this may also be reflected in what ideal form of play he/she will strive to convey to the child [2]. In this case, the ideal form of play is distorted, it is replaced by a certain external standard, ready-made sample, which destroys child's spontaneous play [4]. As a sign of a developed play,

teachers begin to consider an increasingly accurate reproduction of reality. The teacher falls into the trap described by S.L. Novoselova and E.V. Zvorygina [5]: they exploit play to enrich the experience, and does not enrich the experience of children to develop play. In our study, this revealed in adult's didactic, too realistic play environment, as well as in the answers of teachers about the high developmental value of pseudo-play. They emphasized secondary aspects, academic knowledge acquisition as developmental potential of play. These answers did not reflect the unique value of play itself for child development. And vice versa, when the teacher considers play as a creative transformation, he/she recognizes the subjectivity of the playing child, the importance of his/her ideas. In this case, the ideal form is understood by the teacher as a developed play, which is based on the child's own experiences and meanings. And this perspective on play is reflected in the conditions that are created in the preschool classroom. Notably the differences that have emerged can also be related to the quality of the teacher's personal play experience (the more often they play, the more they understand and appreciate play). This assumption needs additional verification and it is a direction for further research.

In general, for the entire sample, the level of quality of play environment according to PERS items 1–3 (space, materials and time for play) turned out to be higher than the level of quality of joint adult-child play (item 5) and support for children's interaction, including mixed-age interaction (items 6–7). This is consistent with the results of other studies showing the difficulty of mastering the partner position for the teacher and the high prevalence of the outsider position [15; 17; 19]. The quality of indirect play support turned out to be of a higher level than expected. Moreover, a higher level is typical for cluster 1. This may indicate that teachers who value spontaneous play and distinguish it from pseudo-play, place more emphasis on indirect support in their practice.

The entire sample is characterized by a lack of conditions for mixed-age interaction and play. Perhaps this is due to a lack of understanding of the significance of this condition for play development or the presence of organizational difficulties (prohibition of mixing groups), a lack of methodological support.

The number of teachers in the sample highly appreciating pseudo-play videos turned out to be less than expected. On the one hand, this may indicate an insufficient representativeness of the sample and the need to conduct research on a larger sample of teachers. On the other hand, this may be evidence of changes taking place in preschool practice, the "renaissance of play" [11]. In order to increase the sustainability of changes, it is necessary to create and develop a community of playing teachers, in which they could receive the support of colleagues and experts, and make their play practice more visible.

Conclusion

Conditions for play development in most preschool classrooms remain at a minimal level. At the same time, classrooms with a good quality of play environment were also identified. The play support strategies differ significantly among teachers with different understanding of the criteria for distinguishing between play

and pseudo-play and the value of play for child development.

As areas for further research, we can point out the study of the influence of teachers' play experience on their perspective on the value of children's play, the study of the level of play development of modern preschoolers, taking into account the quality of the educational environment in their classrooms.

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Psychological Features of the Bodily Experience of Maternity Women with Healthy and Sick Children

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From the standpoint of the cultural-historical approach in psychosomatics, physicality also changes in adulthood: in the situation of illness, aging, the birth of a child, etc., and factors that enrich bodily experience are highlighted. In the postpartum period, this factor may be the child's illness. The paper studies the bodily experience of maternity patients. It has been hypothesized that the bodily experience in the postpartum period changes compared to the usual one, and the bodily experience of maternity hospitals with sick children differs from that of maternity hospitals with healthy children. 136 women aged 19–30 took part in the work: women who do not have children, maternity hospitals with healthy children and maternity hospitals with sick children. The methods “Classification of sensations”, “10 sensations”, “Scale of sensations in the postpartum period”, “Scale of vegetative perception”, “Questionnaire for maternity hospitals”, “Body attention questionnaire” were used. The features of the bodily experience of maternity hospitals with healthy children were revealed: the predominance of the number of physical descriptors over mental ones, etc., and with patients: increased concentration on the sensations from the child etc. The results reinforce the importance of the joint stay of the mother and the baby when placing him in the hospital.

Keywords: bodily experience, corporeality, cultural-historical approach, great-we, social situation of development.

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Психологические особенности телесного опыта родильниц со здоровыми и с больными детьми: культурно-исторический подход в психосоматике

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С позиций культурно-исторического подхода в психосоматике телесность меняется и во взрослом возрасте: в ситуации болезни, старения, рождения ребенка и др., и выделяются факторы, обогащающие телесный опыт. В послеродовом периоде этим фактором может быть болезнь ребенка. В работе изучается телесный опыт родильниц. Выдвигалась гипотеза о том, что телесный опыт в послеродовом периоде меняется по сравнению с обычным, а телесный опыт родильниц с больными детьми отличается от такового у родильниц со здоровыми детьми. В работе приняли участие

136 женщин 19–30 лет: женщины, не имеющие детей, родильницы со здоровыми детьми и родильницы с больными детьми. Применялись методики «Классификация ощущений», «10 ощущений», «Шкала ощущений в послеродовом периоде», «Шкала вегетативной перцепции», «Опросник для родильниц», «Body attention questionnaire». Выявлены особенности телесного опыта родильниц, как со здоровыми детьми (преобладание количества физических дескрипторов над психическими и др.), так и с больными (повышенная концентрация на ощущениях от ребенка и др.). Результаты усиливают важность совместного пребывания матери и младенца при помещении его в больницу.

Ключевые слова: телесный опыт, телесность, культурно-исторический подход, пра-мы, социальная ситуация развития.

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Introduction

The changes that women experience in the postpartum period concern not only the body, but also the psyche: in particular, personality, emotions, cognitive characteristics [14, etc.], etc. Bodily experience, as a collection of sensations, experiences, and representations related to sensory—empirical and cognitive-mediated reflection of one's body, also changes in the postpartum period. According to the cultural-historical approach, corporeality develops throughout life ([1; 9; 13; 19, etc.]. In adulthood, with sharp changes in corporeality, a person is faced with illness and aging, and a woman — at the birth of a child. The development of corporeality coincides with the development of higher mental functions. In other words, this is the path of lifetime formation, socialization, from the direct process to the indirect, which is carried out with the participation of an adult. That is, when analyzing the development of corporeality, it is necessary to study the social situation of development [6]. It was also revealed that social factors limit female corporeality more than male [8, etc.]. Therefore we assume that the postpartum period is an important stage of psychosomatic development. At the same time, it is worth paying attention to the fact that corporeality was little studied in this period.

Based on the analysis of scientific sources, we identified psychosomatic development factors in this period:

— physiological changes affecting the emergence of new intro- and proprioceptive (from lactation and breastfeeding, restoration of the uterus, etc.) and exteroceptive sensations (related to visual perception of body changes, etc., with perception of sound stimuli from a child, tactile feeling of breast augmentation due to lactation, etc.) [14].

— the appearance of new formations in the mental sphere, for example, the appearance of the image of a child, more precisely — the concretization of the image that arose at the stage of pregnancy, the appearance of the internal picture of pregnancy, the postpartum period, etc. In this context, mother perceives the child as an integral part of her body [16; 17]: “body boundaries” are re-formed by 4 months after delivery [18].

— a change in the social role, in particular, the emergence of a maternal role that increases the level of feminization of the body, which is manifested in a change in body shape, gait, etc., the bonding in the mother-child system, for which bodily contact is important, etc. [14].

Bodily alterations in the maternity patients suggest that her bodily experience has specific features.

When corporeality changes in adulthood, factors that enrich bodily experience are distinguished. In the postpartum period, this is a woman's disease [3], ideas about the postpartum period, emotions, personal characteristics [4], the social situation of development and existence [2], etc. It can be a child's disease: for example, some diseases require longer breastfeeding [20], and lactation is part of the bodily experience.

In other words, we *assume*, that the bodily experience of puerperas with sick children is different from that of women with healthy ones.

The purpose of the work — study of the peculiarities of the bodily experience of maternity patients with healthy and sick children.

Organization and methods of research

136 women were studied: 1) 50 women without children, 2) 50 maternity patients with healthy children, 3) 36 maternity patients with sick children.

In order to identify the peculiarities of the bodily experience of the maternity patients, 50 women without children were studied. 56% — with higher education, 44% — with secondary-level education. The selection criteria were: a) age 19 to 30 years ($M = 24.62$, $SD = 2.7$); b) absence of a history of pregnancies, serious diseases.

The main testing was carried out at a time of 1.5 months after childbirth.

In order to do this, first, at the age of 3 days after childbirth, women meeting the following criteria were studied: a) 1 pregnancy; b) natural childbirth; c) marriage; d) age from 19 to 30 years. The results are described earlier [4]. One of the goals at this time was to establish contact in order to agree on a meeting in 1.5 months. This work

was carried out in the maternity hospital of Lyubertsy (head of the department. — N.V. Levkina).

The 1 main group included 50 women at 1.5 months after childbirth. In addition to this, the absence of depression and complications after childbirth and illness in the child was taken into account. 54% — with higher education, 46% — with secondary-level education. Mean age (g): $M = 24.84$, $SD = 2.4$.

The second (2) main group consisted of 36 women at 1.5 months postpartum, whose babies developed obstructive bronchitis. Other selection criteria were: a) -d) — as in 1 main group. 52.8% — with higher education, 47.2% — with secondary-level education. Mean age (g): $M = 25.17$, $SD = 2.1$. This work was carried out in hospital No. 70 (head department — I.V. Devochkina).

The following methods were used:

1) “Classification of sensations” [7]. It studied 2 and 3 tasks: selection from descriptors, which, according to women, mean intraceptive sensations, descriptors known from experience with their subsequent free classification. Classification results were processed by TAXON analysis. Before him, the most frequent features were selected (they were distinguished by at least 35% of people: the ratio of creators) [7]. Such treatment is typical of psychosemancy [10; 15]. Based on distributions of descriptors by women and averaging of these distributions, groups of sensations stood out. Descriptors were ranked by average frequencies of matches with other descriptors of the same group. After that, the frequency of inter-group matches was considered, the groups were structured by taxa layers;

2) “10 sensations”;

3) “Scale of sensations in the postpartum period”,

4) “Scale of vegetative perception” [5],

5) “Questionnaire for maternity patients”,

6) “Body attention questionnaire” (BAQ) by S. Fisher in the adaptation of E.T. Sokolova [11]. The methods 2,3,5 were created by the author [4] to determine the quantitative and qualitative composition of sensations, and were used in maternity patients.

The programs used were Statistica 6.0 and Jamovi 2.3.21. The following methods were used: taxon analysis (psychological method 1), Fisher’s exact test (1–6), Mann-Whitney U test (1–3.5), univariate variance analysis with non-parametric Welch correction, post-hoc analysis (Games-Howell test) (4.6).

Results

When performing the method “Classification of sensations” on women without children, the TAXON analysis showed (Fig. 1) the formation of 6 layers of taxons. 1 taxon — positive emotional sensations, 2 — sensations of premonition, 3 — negative emotional sensations, 4 — feelings from the gastrointestinal tract, 5 — sensations from illness with fever, 6 — sensations of tone, fatigue and pain. In layer 5, feelings from the gastrointestinal tract and from illness are combined, in layer 4 they merge with unpleasant physical sensations, in 3 — pleasant emotional sensations are combined with sensations

of premonition, in layer 2 emotional and physical sensations remain. Therefore, the main categories for sensations are emotional and physical states.

The familiar dictionary of sensations known from experience in women with healthy children differs from the dictionary of women without children in greater undifferentiation (Fig. 2): 1) emotional and bodily states are not the main categories for describing sensations, the main division is by sign: pleasant and unpleasant, 2) reduced differentiation by the number of groups (in women without children — 6, in maternity patients — 3), 3) emotional and physical sensations — in the same groups, 4) descriptor “anxiety” — in the group “more pleasant sensations”: incomplete differentiation by sign. The undifferentiation of the dictionary is associated with the involvement of a huge number of forces, etc., which changes the experience of sensations. Childbirth contributes to an altered state of consciousness [12, etc.], which affects undifferentiability.

In the maternity dictionary, physical sensations prevail over emotional sensations. The volume of the dictionary is similar in maternity patients, and similar to women who have no children. Its internal development by which we mean saturation with verbal forms and verbal nouns, indicating the depth of residence of sensations and concentration on them is also similar with women with children. In maternity patients, the metaphorization of sensations is reduced: in the dictionary — 4 metaphors, in women without children — 9.

When comparing the results of the method “Classification of sensations” in maternity patients with healthy children and maternity patients with sick children, the TAXON analysis showed (Fig. 3) the formation of 7 layers of taxa with descriptors. 1 taxon — feelings of weakness, 2 — sensations from a negative physical state, 3 — sensations from illness, 4 — sensations during and after pregnancy, 5 — sensations from a negative emotional state, 6 — sensations from a negative internal state, 7 — pleasant emotional sensations. That is, for women with sick children, the usual sensations are less significant. Highlighting groups associated with a negative emotional state suggests that the child’s illness causes strong negative emotions experienced at the body level.

The “feeling weak” group means high costs when caring for a child. The dictionary “sensations during and after pregnancy” characterizes the increased importance of communication with a sick child, the desire to consolidate the sensations from it. The basis of “feeling during and after pregnancy” is the only one more often chosen by women with sick children compared to women with healthy ones (33.33% and 6%, respectively, Fisher test = 3,4403, $p < 0.001$).

In layer 6, feelings of weakness and sensations from a negative physical state merge, in layer 5 they merge with sensations from a disease, in layer 4 — with sensations during and after pregnancy, in layer 3 sensations from a negative state of mind merge with sensations from a negative internal state, physical and emotional sensations remain in layer 2.

In such a way, unlike maternity patients with healthy children in maternity patients with sick children, the

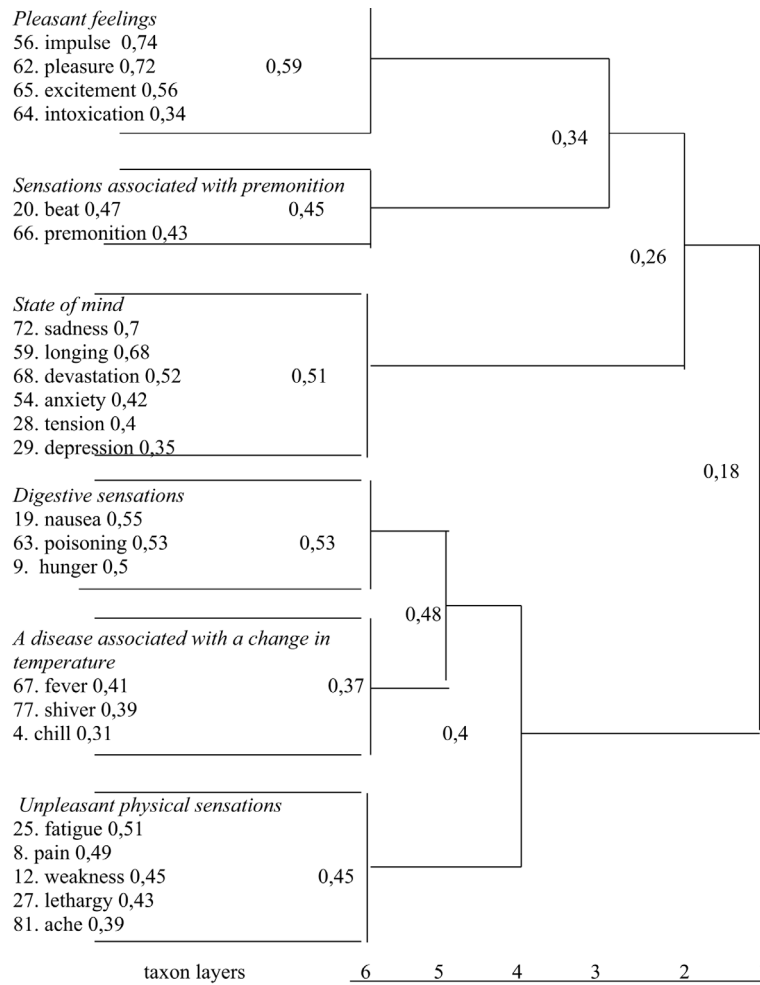


Fig. 1. TAXON-analysis of the results of sensation classification (women without children)

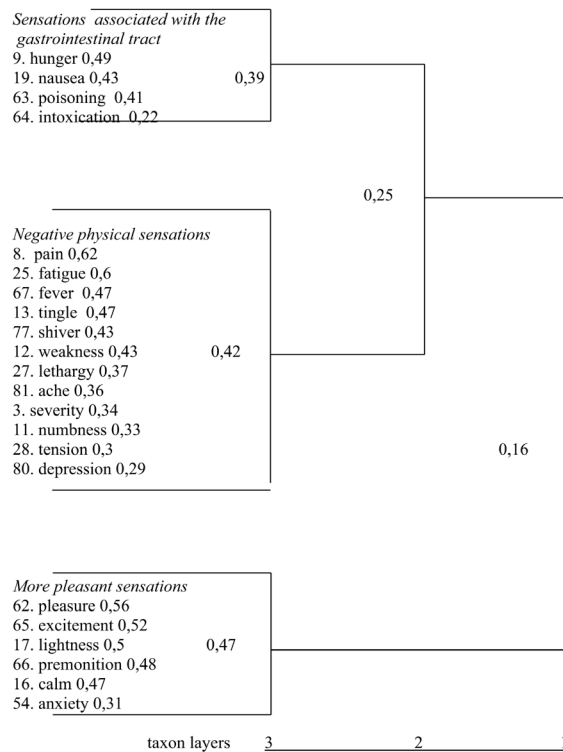


Fig. 2. TAXON-analysis of the results of the classification of sensations (maternity women with healthy children)

main categories for describing sensations are emotional and physical sensations. The listed is similar in women with sick children and women without children. However, the signs of emotional sensations are not so fully represented, in these 2 categories the emotional sensations are fuller and semantically homogeneous than the signs of physical sensations, which is not the case for maternity patients with healthy children.

The main dividing criterion for emotional states is the sign, as in women without children. The dictionary of negative emotional sensations in women with sick children is differentiated into 2 groups. The fact that they stand out first also speaks of their importance.

The dictionary of women with sick children is more differentiated compared to women with healthy children, i.e. in this it is similar to the dictionary of women without children: 1) in a familiar dictionary of sensations, they have more groups (7 compared to 3), 2) sensations in the 1st queue are divided into physical and emotional, 3) physical and emotional sensations – in different groups. More differentiation of sensations means more experience in distinguishing them. A change in the

level of wakefulness, which contributes to the undifferentiation of bodily experience after childbirth, is also transformed: the level increases, since a woman needs to respond to the condition of the child.

The average number of sensations in a familiar dictionary in women with healthy children is 22, women with patients – 30: the main increase is due to emotional sensations. In both groups, physical sensations prevail over emotional sensations.

In maternity patients with sick children, there is a higher level of dictionary development: 4 verbs and 12 verbal nouns, in women with healthy ones – 1 and 9. Internal development increases in groups of negative sensations, and the dictionary “sensations during and after pregnancy” consists entirely of verbal nouns.

Metaphorization of sensations is increased in women with sick children: in women with healthy – 4 metaphors, in women with sick – 9, as well as in women without children (“psychologization” of the dictionary).

Comparison of the results of the three samples according to the “Scale of vegetative perception” using a univariate analysis of variance with a non-

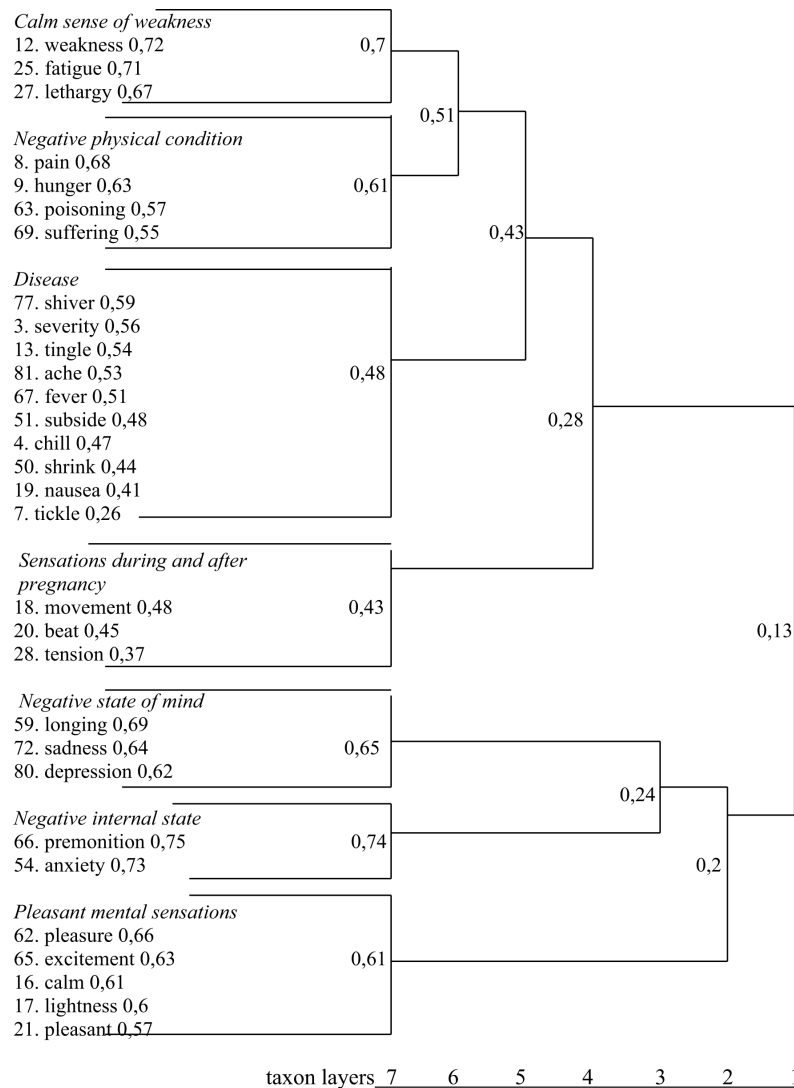


Fig. 3. TAXON-analysis of the results of the classification of sensations (maternity women with sick children)

parametric Welch correction revealed significant differences in the experience of sensations “sometimes weakly” (Welch = 13.7, $p < 0.001$), “sometimes strongly” (Welch = 31.09, $p < 0.001$), “often strongly” (Welch = 17.40, $p < 0.001$), and also in the average number of symptoms (Welch = 29.49, $p < 0.001$).

Post-hoc analysis (Games-Howell test, Table 1, 2) showed that there is no difference in the intensity and frequency of sensations between maternity women and women who have no children. There is a difference in 26 of 29 sensations ($p < 0.05$, Fisher test). At the same time, the percentage of maternity patients experiencing each sensation separately is less than the percentage of women without children. This is due to the fact that one of the main sensations is relief from removing the burden of pregnancy: in contrast, ordinary sensations fade.

Only one sensation is more often experienced by the delivery women: “blurry vision, specks”. It means a violation of the clarity of consciousness, which corresponds to the fact that in this period the state of consciousness changes [12, etc.].

Post-hoc analysis (Games-Howell test, Table 1, 2) showed that maternity patients with healthy children differ from those with sick children in the num-

ber of sensations experienced “sometimes weakly” ($p = 0.013$), “sometimes strongly” ($p < 0.001$), “often strongly” ($p < 0.001$), and also – the average number of symptoms ($p < 0.001$). When comparing women with healthy and sick children using the Fisher test, a difference ($p < 0.001$) was found in 5 sensations: for example, 88% and 66.7% of women, respectively, noted “feeling hot” ($\phi=2,3926$). According to all sensations, the percentage of women with sick children is less than in women with healthy ones: ordinary sensations are unimportant for one group, since sensations from a child are more important.

According to the BAQ method (Table 3, 4), the parts of the body that maternity patients think about less often than women without children is neck. The more often they think about the chest, head and torso. Women with sick children, compared to women with healthy ones, are less likely to think about their hands, but more often about their stomach. The belly plays a significant role since it is the space where the child was.

According to the “10 sensations” method, the following number of maternity patients of the “normal” group calls the following: feeling from the absence of the abdomen – 64%, fatigue – 56%, feeling from the

Table 1
Results on the Scale of vegetative perception (the “*” sign indicates the reliability of differences, $p < 0.05$)

Response category (number of selections) Category of women	Sometimes weakly	Sometimes strongly	Often weakly	Often strongly	Average number of symptoms
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Women without children	2,9 (1,4)	0,9(0,8)	0,72 (0,6)	0,24 (0,4)	4,76 (2,0)
Women with healthy children	3,76 (2,3)	0,76 (0,7)	0,5 (0,6)	0,38 (0,5)	5,4 (2,5)
Women with sick children	5,33 (2,6)	2,25 (1,0)	0,44 (0,6)	1,14 (0,8)	9,17 (3,0)

Table 2
The Scale of vegetative perception (post-hoc analysis, Games–Howell test)

Response category (number of selections) Category of women	Sometimes weakly	Sometimes strongly	Often weakly	Often strongly	Average number of symptoms
	Women with healthy children + women with sick children	MD =-1,57 * p=0,013	MD =-1,49 *** p<0,001	MD =0,06 p=0,896	MD =-0,759*** p<0,001
Women with healthy children+ Women without children	MD =-0,86 p=0,063	MD =0,14 p=0,634	MD =0,22 p=0,175	MD =-0,14 p=0,288	MD =-0,64 p=0,331

Note: MD-mean difference; «*» – $p < 0,05$; «***» – $p < 0,001$.

Table 3
BAQ results (the “*” sign indicates the reliability of the differences, $p < 0.05$)

Response category Category (average of women rank)	Chest	Belly	Head	Torso	Arm	Back	Leg	Neck
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Women without children	5,48 (2,0)	4,72 (2,4)	3,5 (2,2)	4,38 (2,2)	4,28 (2,0)	4,28 (2,2)	3,48 (2,4)	5,88 (1,9)
Norm, 1.5 months after delivery	6,38 (1,6)	4,7 (2,6)	4,68 (1,9)	5,70 (1,8)	4,9 (1,8)	4,5 (2,1)	3,08 (1,5)	2,14 (2,0)
Women with sick children	6,67 (1,5)	6,97 (1,1)	4,47 (1,2)	5,61 (1,6)	1,58 (0,8)	5,22 (1,3)	3,64 (1,6)	1,86 (1,0)

Table 4

BAQ (post-hock analysis, Games–Howell test)

Response category (average Category rank) of women	Chest	Belly	Head	Torso	Arm	Back	Leg	Neck
Norm, 1.5 months after childbirth + women with sick children	MD = -0,287 p = 0,670	MD = -2,27*** p < 0,001	MD = 0,208 p = 0,811	MD = 0,089 p = 0,967	MD = 3,32*** p < 0,001	MD = -0,722 p = 0,123	MD = 0,0559 p = 0,123	MD = 0,279 p = 0,678
Norm, 1.5 months after delivery + Women without children	MD = -0,9* p = 0,045	MD = 0,02 p = 0,999	MD = -1,18* p = 0,012	MD = 1,32** p = 0,003	MD = -0,62 p = 0,244	MD = -0,22 p = 0,865	MD = 0,4 p = 0,577	MD = 3,74*** p < 0,001

Note: MD-mean difference; «*» – p < 0,05; «***» – p < 0,001.

uterus – 44%, lactation – 36%, etc. Women with sick children call: relief – 44.44%, pleasure from touch – 38.89% (among women with healthy children it is noted only in 2%, $\varphi=4,8631$, $p < 0.001$), a surge of strength – 33%, “joy from admiration of the child felt by the body”, etc. – 33.33% (among women with healthy children they it is called only among the 2%, $\varphi=4,3279$, $p < 0.001$), etc. The average number of sensations in the “normal” group in the “10 sensations” method is $3,63 \pm 1,8$ sensations, in maternity patients with sick children – $3,46 \pm 1,9$ (the difference is insignificant), typical sensations:

Women with healthy children	Women with sick children
1) relief	1) relief
2) fatigue	2) the pleasure of touch
3) sensations from uterine contraction	3) a surge of strength / joy felt by the body
4) sensations from the lactation	

According to the Scale of sensations in the postpartum period (Table 5) women with healthy children compared to women with sick children experience fewer “sometimes strongly” sensations.

When comparing maternity patients with healthy children and maternity patients with patients according to the Fisher test, there is a difference ($p < 0.001$) in 7 sensations: for example, 40% and 5.6% of women noted “weakness”, respectively ($\varphi=4,8631$). According to most feelings, the percentage of women with sick children turns out to be less than in women with healthy ones:

feelings of weakness, etc., are less important for maternity patients with sick children, the concentration on feelings from the child is 1 plan.

In the Maternity Questionnaire, women with sick children more often than women in the normal group indicated that there were no new feelings after childbirth. However, touching the child was noted more often (33.33% and 2% of women, respectively, $\varphi=4,8631$, $p < 0.001$) and emotions experienced at the body level. Feeding, as a new sensation, was more often called by women with sick children (1 place), breast condition was called as the first less often.

In other words, the bodily experience of childbirth differs from that of women without children as follows: 1) the same volume of the dictionary of descriptors known from experience with a change in content: increase of general tone sensations, less internal development of content of group of pleasant sensations, reduction of number of sensations from negative emotional state, 2) undifferentiation of physical and emotional sensations, physical sensations by systems and organs, 3) the main division of sensations is by sign, but it also has an incomplete undifferentiation, 4) reduced metaphorization, 5) predominance of physical sensations over emotional sensations, 6) similar internal development, 7) slightly increased frequency of sensation occurrence, 8) one of the main sensations is physical relief, 10) the presence of sensations associated with impaired clarity of consciousness, 11) less spatial diversity of sensations.

Table 5

Results on the Scale of sensations in the postpartum period (the “*” sign indicates the reliability of the differences, $p < 0.05$)

Response category (number of selections) Category of women	Sometimes weakly	Sometimes strongly	Often weakly	Often strongly	Average number of symptoms
	M (SD) / M (SD)	M (SD) / M (SD)	M (SD) / M (SD)	M (SD) / M (SD)	M (SD) / M (SD)
Women with healthy children / women with sick children	6,3 (1,7) / 5,28 (1,5)	0,86 (0,4) / 3,11 (1,1) *	1,86 (1,4) / 1,11 (0,4)	1,3 (,5) / 1,11/(0,5)	10,32 (13,8) / 10,61 (2,9)

In maternity patients with sick children, compared with maternity patients with healthy children, the bodily experience differs in the following:

1) scope: a) expanding the composition of descriptors known from experience by expanding negative and positive emotional sensations, sensations during and after pregnancy and negative physical sensations, but not specific to the postpartum period or not locally painful; and sensations associated with a violation of general tone and emotional tension, experienced at the body level, characterized by increased frequency and intensity, b) the number of physical sensations prevails over the number of emotional ones;

2) content: a) dictionaries of sensations are more metaphorized, b) concentration on sensations in the abdomen is more frequent, in the hands is more rare, c) a dictionary of sensations known from experience in maternity patients with sick children looks more like a dictionary of women without children compared to maternity patients with healthy children, d) a dictionary of familiar sensations is more developed, especially — a dictionary of “sensations during and after pregnancy”, “negative physical condition”, “illness”, the latter group has developed a part related to emotional tension experienced at body level, e) bodily experience is characterized by the involvement of the emotional sphere in the bodily, f) the state of the breast acts less often as a new sensation, sensations from touching the child, as well as emotions experienced at the body level act as new sensations of the postpartum period; these women are characterized by a concentration on touch,

3) structure: a) the dictionary “sensations during and after pregnancy” appears, b) “sensations during pregnancy” is more often chosen as the basis for classifying familiar sensations, c) the dictionary of sensations is characterized by increased differentiation.

Discussion

Among the differences in the bodily experience of women with sick children, the concentration on the sensations of the child and their inclusion by women in their bodily experience are especially important for practical use.

Despite the fact that the mother and the newborn exist in unity (on the part of the child, L. Vygotsky denotes this consciousness of mental community as the consciousness of “pra-we” [6], E. Erickson, D. Vinnikot, M. Mahler, D. Stern and others, consider mother and child as part of a single dyadic system, etc.) [cite. 14 et al.], the maternity patient does not attribute the feeling from the child to her bodily experience. The increased connection with the child in maternity patients with sick children is present in the form of a designation of sensations from the child in her bodily experience.

Back at the turn of the 20th-21st century, the principle of sterility prevailed in medical institutions, which implies restricting the admission of parents to the hospital to a child. Now the understanding that the stay of the child with the mother creates a favorable emotional

atmosphere for the recovery of the child goes to 1 plan. Changing the bodily experience of maternity patients with sick children by incorporating child-related sensations into it is a factor further showing the importance of mother-child hospital stays together. This can be explained by the fact that in addition to the emotional discomfort of the child, arising in the event of their separation and affecting the recovery of the child, his emotional state is influenced by the state of the mother. The emotional state of the mother worsens, which is associated not only with experiences for the health of the child, but also with the inclusion of sensations from the child in her bodily experience, i.e. the feeling of the temporary loss of a part of herself.

Today, the idea of the importance of staying together is increasingly resonating, but due to changes in the epidemiological situation, the principle of sterility has begun to take up more space. We hope this work will be one of the factors that do not allow the principle of sterility to outweigh the principle of the importance of the emotional connection between mother and child.

Conclusion

1. The postpartum period is one of the stages of the psychosomatic development of a woman with changes in the content, volume and categorical structure of bodily experience.

2. The normal or complicated course of the postpartum period affects the specifics of bodily experience.

2.1 The bodily experience of maternity patients with healthy children is characterized by richness, internal development, predominance of the number of physical descriptors over emotional ones, incomplete differentiation, change in the main criterion for the classification of sensations (division by sign), low metaphorization.

2.2 The bodily experience of maternity patients with sick children is manifested in an increased concentration on the sensations of the child, experiencing emotional tension and anxiety at the body level, a developed system of interaction with bodily sensations, and higher internal development.

3. The results increase the importance of mother-child postpartum co-stay when placing a child in a hospital.

A comparative analysis of the bodily experience of women without children and the bodily experience of maternity patients made it possible to distinguish the features of the bodily experience of maternity patients. Comparison of the bodily experience of maternity patients with healthy and sick children revealed the features of maternity patients with sick children. One of the important characteristics of the bodily experience of maternity patients with sick children is the concentration on the sensations of the child and their inclusion by women in their bodily experience.

The results increase the significance of mother-child postpartum co-stay when the child is admitted to hospital. This adds the factor of the emotional well-being of

the mother associated with both the experiences of the child's health and the inclusion of the sensations of the child in her bodily experience to the factor of the importance of the emotional comfort of the child when staying together with the mother in the hospital. In such a way, it follows from the work that the emotional state of the maternity patient with a sick child, which is considered

very important for the child, can be deteriorated due to a separate stay, since the mother can feel parting with the child as a temporary loss of part of herself.

The work can be continued as part of the study of other categories of maternity patients, other aspects of the bodily experience of maternity patients with sick children, etc.

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