

# Learning Activity as The Zone of Proximal Development of Reflexive and Communicative Abilities of Children Aged 6–10 Years

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The article presents precedents for the implementation of theoretical ideas laid down by L.S. Vygotsky in the concept of the zone of proximal development in modern developmental education. The importance of developing reflexive and communicative abilities of children 6–10 years old in educational activities is justified. The approach to the construction of the zone of proximal development as a specially organized form of collective learning activity of an adult and children in primary school is adopted. The system of developmental training of D.B. Elkonin–V.V. Davydova is considered as an example of activity technology that implements the ideas of L.S. Vygotsky about joint activities as a form of child development and, in fact, the zone of immediate development of reflexive and communicative abilities of 6–10 years old children. The results of the experimental study of the development of reflexive and communicative abilities of junior schoolchildren in national and local educational activities are presented.

**Keywords:** zone of proximal development, reflexive and communicative abilities, activity content of education, joint collective-distributed learning activity.

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# Учебная деятельность как зона ближайшего развития рефлексивных и коммуникативных способностей детей 6–10 лет

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В статье представлены прецеденты реализации теоретических идей, заложенных Л.С. Выготским в понятие зоны ближайшего развития, в современном развивающем образовании. Обосновывается важность развития в учебной деятельности рефлексивных и коммуникативных способностей детей 6–10 лет. Утверждается подход к построению зоны ближайшего развития как особо организованной формы коллективной учебной деятельности взрослого и детей в начальной школе. Система развивающего обучения Д.Б. Эльконина–В.В. Давыдова рассматривается как пример деятельностной технологии, реализующей идеи Л.С. Выготского о совместной деятельности как форме детского развития и, по сути, зоне ближайшего развития рефлексивных и коммуникативных способностей детей 6–10 лет. Представлены результаты экспериментального исследования развития рефлексивных и коммуникативных способностей младших школьников в совместной учебной деятельности.

**Ключевые слова:** зона ближайшего развития, рефлексивные и коммуникативные способности, деятельностное содержание образования, совместная коллективно-распределенная учебная деятельность.

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## 1. The Zone of Proximal Development as a Methodological Principle of Developing Education

In the system of terms of the cultural-historical psychology, the term “Zone of proximal development” (ZPD) is one of the major. Scientific analysis of the cultural-historical direction in scientific publications in 2009-2019 showed that the most number of publications is related to the keywords: “Activity”, “Instrument”, the “Zone of proximal development” [17]. V.K. Zaretsky writes that “the zone of proximal development has drawn an amazing line from a general peripheral moment of the cultural-historical concept to the important methodological principle of diagnostic, pedagogical, correction-developing and, in last years, psychotherapeutic work” [9, p. 49].

Scientists’ interest to the term the zone of proximal development can be clearly explained: on the one hand, this term defines interactions and interrelations between an adult and a child in education as overall and necessary form of child development, on the other hand – sets the general orientations to create psycho-pedagogical conditions of scientific terms, meta subject competences and personal educational results in children in the education process. Also, a number of publications on the possibility to use this term in the educational practice, differences in the interpretation of its sense and content provide the basis

for attentive consideration of the texts by L.S. Vygotsky in which he states the necessity to present this term.

The term “Zone of proximal development” was introduced by L.S. Vygotsky in the middle of the 30es years of the last century in the context of discussing the problems of relation of education and mental development. In his article “The Problem of Education and Mental Development in School Age”, L.S. Vygotsky critically analyses three unsuccessful approaches to solving the problem and offers his solution. The approach of L.S. Vygotsky is based on the difference but not on opposition of education and development, on accepting his unity but not equality. He mentions that for scientific understanding of the relation of education and development, it is necessary to introduce a new, highly important term into science without which the issue under discussion cannot be solved in the right way. The topic concern the so-called zone of proximal development [5, p. 383]. According to L.S. Vygotsky, there is no concern about the necessity to define the level of a child’s development which is the result of completed cycles of his development (actual level) to identify the possibility of his education. Nevertheless, to organize the process of education, it is not enough to use only the knowledge about the child’s actual level of development: it is important to know what stays inside his zone of proximal development, which means what the child is able to do together with the adult and under support by the adult. “The difference between the levels

of the problems to solve which is available together with the adult, under support by the adult and in separate activity defines the zone of proximal development" [at the same place, p. 385]. What the child can do today only under support of the adult, he can do alone tomorrow. The education arranged in the right way, creates the child's zone of proximal development, starts a number of internal processes of development.

The term of zone of proximal development is explained by L.S. Vygotsky as a form and method of developing "historical peculiarities of the human" in the child. For L.S. Vygotsky, the term of zone of proximal development fixes the law of the child's development, his development in education — the child develops in the society with the adult and peers. The role of an adult (a teacher) in the zone of proximal development is to organize the joint activity, relation of his activity with the child's activity. The key issues of the zone of proximal development for its creator are 1) development as appearing of new, potentially new in education, 2) development in society with an adult (a teacher) and peers (friends), 3) development in school education with the help of learned scientific terms, 4) individual differences in the levels of actual and in the zone of proximal development of classmates creating the basis for help individualization when learning a scientific term, 5) priority of defining the zone of proximal development when diagnosing the level of a pupil's mental development.

The precedents of the local practice-oriented studies including the explaining opportunities of the zone of proximal development construct, as a rule, are performed during solving actual problems of developing education oriented to the exact aspect, sense of this term.

For G.A. Zuckerman, the zone of proximal development is a special form of a child and an adult, in which the action of the adult is focused on the support of the initiative, separate action of the child. According to the author, the main idea of the developing education designers is to "prepare the meeting of the child and adult, a teacher and a pupil in a way it happens directly in the zone of proximal development of the children's' initiatives in a new type of interaction" [20, p. 72]. The relation of the one who can and the one who can not, the who knows and the one who does not know is an initial form of joint activity able to create the zone of proximal development. The developed form of such an interaction is a cooperation of the equals represented in relation "an adult — a group of people". Scientist assume, that the definition of ZPD as an area of transition from dependence to independence under support of an adult shall be added with an element "zone of half-dependence" As an intermediate stage between independently performed action (as the first stage). Especially in this area, a child who acts with his peer as with an equal partner, has an

opportunity to practice traditionally adult actions in terms of control and evaluation. As a result, the practice and assumption of all kinds of actions inside the structure of the educational activities becomes possible. Thus, the adult's role is in special organization of the interaction of children which provides the development of studying ability [20, 21].

Based on L.S. Vygotsky's ideas about the zone of proximal development, V.K. Zaretsky developed the reflexive-activity approach to help children overcome learning difficulties. "The main idea of the approach, — writes the author, — is to base on the resource of the child as the subject of learning activity, its reflexivity and own development. This means that the task of a teacher — to help the child feel himself the subject of his own activity and its reflexivity, help him be in this a partner-colleague, help him enlarge his own resource. Since the child asks the adult for help, when is not able to act alone, meaning in ZPD, the adult is able to support him in a way to do it on his own, understand what he could do himself, which difficulty he faced, how exactly the adult helped him and what he needs to learn to do it on his own in future" [9, p. 51-51]. Reflexive-activity approach is an effective system of principles and technologies of support of the child's development in the process of his cooperation with adults and peers, based on the support of the child's position as a subject of his activity, its reflexivity, reconstruction and building of the ways of its implementation.

The profound analysis of the term the zone of proximal development in psycho-pedagogical studies and approaches to its implementation in the domestic and foreign educational practice was provided by A.A. Margolis [12; 13]. The analysis allowed the researcher to declare that the concepts and ideas of L.S. Vygotsky put in the term the zone of proximal development, have not been fully implemented in any of the existing systems of education.

A.A. Margolis mentions that the key idea of L.S. Vygotsky's ZPD is the development of scientific terms on the basis of the every-day ones: cooperation of the child and adult in the process of education is oriented to learning of scientific terms. ZPD is the scientific term; something that a child is not able to do. The child enters this zone with his initial concepts, life ideas, that become the actual level of his development. The development of scientific terms — a movement in the zone of proximal development — occurs on the basis of the development of every-day concepts. The learning process is the process of joint activity of the student and teacher on arranging of the scientific terms, summarised ways of action on the basis of development, transformation of the existing spontaneous terms. Based on this view, it can be stated that during the interaction in the form of ZPD between the teacher and student, the teacher shall create conditions to develop spontaneous concepts in the students.

ZPD in this case can be considered as an area (a unit of learning) in which in the process of specially organized interaction between the teacher and student (or the interaction between the students organized by the teacher), the process of spontaneous concepts and their transformation into scientific terms is taking place. [13, p. 22]. Therefore, the development of the methods of development in learning scientific terms on the basis of the initial concepts the children have, with orientation to the zone of proximal development when organizing the learning activity of the students, serves as a perspective direction of psycho-pedagogical studies.

## 2. Communicative and Reflexive Abilities as Learning Results of the Primary School

Researchers' special interest to the construct the "Zone of proximal development" comes from active discussing of the goals and content of general education in the worldwide pedagogy. In the last decade the school education revises the traditional focus on the subject knowledge, abilities and skills. The key competences of 21<sup>st</sup> century become the goals of education. The concept of the key competences (4K): critical thinking, creativity, communication, cooperation received a wide acknowledgment in pedagogical community. The abilities of reflexivity, communication, interaction and cooperation are considered as the educational results of general education within this conception.

Thus, FGOS of the primary general education defined a wide list of reflexive and communicative abilities of the primary school graduate as personal and meta subjective learning results:

- Development of cooperation abilities with adults and peers in different situations, the abilities not to create conflicts but find solutions out of disputable situations;
- Mastering the ways of problems solving of creative and searching character;
- Mastering of the initial forms of learning and personal reflexivity;
- Active use of the speech means and means of informational and communicative technologies for solving the communicative and learning tasks;
- Readiness to listen to the person and stay in dialogue;
- Readiness to accept the possibility of different points of view and the right of each and every one to have his own opinion, express his position, and argue his point of view and relation to an event
- Ability to define the general goal and ways to achieve it, agree the functions distribution and roles in the joint activity
- Readiness to solve the conflicts in cooperative way considering the interests of the parties [19]. Defining the

content and methods of mastering these competences, and the means of the evaluation to reach them belongs to the actual problems of modern psycho-pedagogical science.

In the latest years, "great ideas" became one of the remarkable approaches to master the content of general education. When defining this term, the scientists base on theoretical best practices of the greater frame "concept-based learning" (CBL). The idea of CBL is reorientation of the education from mastering the lists of facts and topics to the set of generalizations expressed by the concepts. When such an education is applied, the facts and topics are always a part of wider general context represented by these concepts. The facts and topics play the role of the linking element of the isolated material into the general picture [1, p. 3]. Scientists distinguish three main directions inside which the ideas close to CBL were expressed: 1) developing education by D.B. Elkonin-V.V. Davydov, 2) problem education (I.Ya. Lerner), 3) organization of education through basic meta-subject terms (Yu.V. Gromyko) [at the same place, p.7].

Admitting in general the possibility to place the present directions of the domestic psychology and pedagogy to the concept of "great ideas", we shall mention that they are united mainly by orientation on the activity content of education – the core of the theory of education activity as the method of the system of developing education by D.B. Elkonin-V.V. Davydov [8; 23]. The main ideas of the cultural-historical psychology of L.S. Vygotsky were implemented in the theory of education activity [2; 3; 4; 5]. The key idea was the concept on the process of education as the children's zone of proximal development by L.S. Vygotsky as a joint activity of children and adults in the form of the joint learning activity.

## 3. Development of Reflexive and Communicative Abilities of Children in the Joint Learning Activity

The main ideas of the theory of learning activity in the primary school is specified in the works by V.V. Davydov to the fullest possible extent [6; 7; 8]. Below are the key ideas:

- 1) Learning activity – an activity by doing which the children together with an adult (a teacher) master scientific (theoretical) terms and corresponding forms of activities;
- 2) The children master the ways of activity by solving special learning problems and doing specific learning activities: transforming, modelling, model transforming, controlling and evaluation;
- 3) The learning activity is built by an adult (adults) as a group activity – its basis is learning discussion, dialogue, open interaction between children and adults;

4) When solving learning problems and doing learning activities in the form of the group activity, the ability to analyse and plan own activities is developed in children, and also the reflexion as a special ability to consider own actions in the joint activity with others.

The basis of the activity learning content in the theory of the learning activity by V.V. Davydov is the scientific term as a generalized way of activity in the defined area. By mastering the ways of the activity which stay behind each of meta-subject terms, a pupil develops in mastering the content of the learning material. Knowledge is mastered by the child simultaneously with the method of action to acquire it. This is possible provided that the methods of activity are the goal and subject of development for the student. Being systematically involved in the implementation of educational activities to master scientific concepts, the student also masters the structural elements of educational activity, learns to learn. Educational activity can become a part of the content of education, provided that it becomes the subject of reflection and awareness. In the reflection of their transformations in the conditions of the learning situation, students single out and fix a general way of solving a whole class of specific practical problems. It is reflection that turns learning activity into the content of education, during the development of which the subjective position of the younger schoolchild, the subjectivity of his learning activity, becomes and develops.

We shall note a special role of educational subjectivity of the action of modeling in the development of reflection and the formation. The model representation of the significant relations of the subject area identified in the course of solving the educational task in the subject, graphical or alphabetic form and subsequent actions to transform the constructed model constitute the necessary links in the process of assimilation of theoretical knowledge and generalized methods [8]. B.D. Elkonin notes that “the concept-generalization is carried out in the model. The model is the language of a scientific concept” [22, p. 32]. When building a model and when deriving specific practical tasks from the model, the subject of schoolchildren’s actions is the method of actions, reflection of their actions and their reasons.

The study of the learning activity as a zone of proximal development of reflexive and communicative abilities of children aged 6-10 is based on the central methodological principle of cultural-historical psychology about group activity as the initial form of development of human consciousness, his abilities and personality. With this approach, initially external collective activity acts as a kind of “Scene” for the actualization of mental processes, and the “School” as an institution of training and education is a culturally organized space of developing communities and activities of an adult and children (children them-

selves). The success and result of learning depends on how these communities and activities are built and developed: educational trajectories are formed for a particular child, his abilities are preserved and developed.

Today, the most striking example of the implementation of the idea of L.S. Vygotsky about cooperation between an adult and a child, about the interaction of children with each other in the zone of proximal development is the experience of organizing collectively distributed educational activities of children of primary school age in the system of developmental education by D.B. Elkonin-V.V. Davydov. In addition to the learning activities identified by V.V. Davydov, V.V. Rubtsov in his research substantiates a system of joint learning activities related to the coordination, planning and organization of interactions between students and adults, students with each other in solving a learning problem [14; 15; 16; 17; 18]. These actions are performed in the space of transformation by the learning community of the ways of action set by adults and modeling of new patterns of organization of joint learning activities to achieve a common result based on the processes of communication, reflection and mutual understanding.

In a study on the role of mutual understanding in the formation of concepts in children, it was revealed that the necessary condition for the emergence of mutual understanding between partners in joint activities is the restructuring of the methods set by adults for organizing their joint activities, achieved by participants through the analysis of the possibilities for cooperation of individual actions and their inclusion into the structure of joint action in connection with objectively changing conditions of activity [16]. If in experimental situations the participants turned to the analysis of the method of interaction with each other, tried to correlate their actions with the actions of their partner, they managed to identify the principle of organizing the subject area of the task. If the children were limited to simple control over the external conditions of the task, the process of the joint work fell apart, the task was not solved by the participants. It follows that the process of assimilation of the concept by students, the discovery of essential principles of organization of the studied subject is directly related to the way of organizing and coordinating the interactions of children and adults, communication of children among themselves in the process of solving problems [14].

In the experimental study of the joint actions of an adult with children and children between themselves, three different ways of organizing a joint action were identified, depending on its relation to an object or sign. *The first* way of organizing the action was built by the children without taking into account the result of their partner’s operation. This method of organizing the joint action turned out to be a characteristic of those groups

where students were oriented to the external features of the object and the possibilities of individual action in relation to solving the problem and did not set themselves the task of controlling the joint action. *The second way* of organizing the action was built considering the result of the partner's operation. This happened in those groups of participants who were guided by the connection of external signs. In this case, the selection of the principle of systematization of objects occurred through the correlation of individual operations and the construction of joint action on this basis. *The third way* of organizing the joint action was built considering the links between the individual operations of the participants. Consideration of the organization scheme of the subject area of the task through the coordination of individual operations performed by the participants was specific for these groups was. The solution of the task for these groups was mediated by a new task — the organization of joint activities [15].

In each of the above studies, the communication of children with adults and among themselves, their "speech production" was subjected to a special analysis. The authors noted the dynamics of the development of the joint action: at the initial stages, operations between children were randomly divided, but later on, individual operations were distributed and coordinated depending on the scheme of joint action. As a result, from a discussion in the process of communication of operations with specific objects, the children moved on to an analysis and discussion of the very ways of building a joint action. In addition, the dynamics in the development of communication between students and the experimenter was noted. In the course of the transition of children to the joint action, to the analysis of the relationship of individual actions, they less and less turned to the experimenter and tried to involve the adult directly in the work of the group, their approaches to the adult were predominantly in the nature of demonstrating these possibilities of the joint actions. These features of communication indicated a commonality emerging between the participants, in which the organization of children's interactions with each other came to the fore front in relation to the solution of the objective problem [16].

In studies of this direction, communicative acts carried out by participants in an effective form were identified and described, for example, when one of the participants stopped in the process of performing an individual operation and continued it only after the start of the operation by his partner, as if in response to his action, in the attempt to anticipate, foresee and plan for the overall intended outcome. Consequently, for the emergence of mutual understanding between the subjects of the joint activity, the action situation itself is not enough, it is necessary for the oncoming movement of subjects expressing and coordinating their attitudes, intentions

and points of view regarding the object of action, during which the positions of each participant will be processed, rethought and take on the form, which cannot arise outside the situation of communication.

In studies of jointly distributed learning activities, it was shown that the psychological basis of developmental learning is the inclusion in the joint learning activities of various models of participants' actions, as well as models of the very forms of organizing joint activities. It is proved that the organization of the joint actions, which determines the genesis of educational and cognitive action, involves the connection of various models of object transformation (action schemes) and the differentiation of models with respect to the total product obtained in the activity. Such an organization initially arises under the conditions of involving various schemes of actions with an object in the process of performing common work and building a model of the action of another participant in the activity. It is under these conditions that the relationship between the scheme of one's own action and the corresponding change in the object being studied can be singled out and fixed by the student himself [18]. The data obtained in the research demonstrated the significant potential of a special organization of educational interactions between students and adults studying with each other in terms of developing the reflexive and communicative abilities of children aged 6–10.

Continuation of studying the joint learning activities as a zone of proximal development of meta-subject educational results of younger schoolchildren — the ability to learn, theoretical thinking — was the study of the psychological conditions for the development of personal educational results of children 6–10 years old: communicative and reflective abilities. We undertook an experimental study of the process of the formation and deployment of communicative and reflexive actions in the joint (paired) activity of primary school children to complete tasks that involve the coherence and coordination of individual actions to achieve the desired result. The research procedure, built on extracurricular material, completely modeled the learning situation in the search for a common mode of action in a particular subject area as the starting point of learning activity.

#### **4. Experimental Research of the Zone of Proximal Development of Reflexive and Communicative Abilities of Younger Schoolchildren**

Based on the above theoretical positions, as well as on the results of experimental studies of the collectively distributed educational activities of younger schoolchildren, we put forward the assumption that the most pro-

ductive process of developing reflexive and communicative abilities in children aged 6–10 occurs with a special organization of their educational interactions with an adult and between themselves, during which a gradual reorientation of students from the subject content of the problem being solved to the very method of interaction and organization of joint action is carried out.

To confirm this assumption, the “Scale” technique developed by V.V. Rubtsov and L. Martin [16] was applied. The technique is a round metal platform mounted on a metal tripod in such a way that the center of the platform acts simultaneously as the center of gravity. Three scales equally spaced from each other are applied to the platform on top, on which loads of different weights were placed. Children in the experiment work in pairs. They were offered balance problems, the correct solution of which depended on taking into account the ratio of the weight factors of the loads and their distance to the center of gravity. At the same time, the actions between the participants were distributed in such a way that one of them could change the weight of the load installed on his working half of the platform, but could not change the distance, and his partner, on the contrary, could change the distance of the load to the center of gravity, but could not regulate its weight. Each student worked only on his own half of the platform [11].

A specific feature of this technique is that the nature of the initial distribution of individual actions does not allow students to correctly solve the tasks alone, without involving a partner in the solution process. The activities of the partners were organized by the adult in such a way as to actualize the processes of communication and reflection among students from the very beginning of the work. As a result, we could directly observe and record the specific features and dynamics of the transformation of communicative and reflective processes that unfold between partners in the course of joint activities and the construction of a joint educational and cognitive action.

In total, the study involved 42 children of young schoolchildren (6–10 years old), students in grades 1–4 of 2 secondary schools in Moscow (see Table 1).

The specific features of the communicative and reflexive processes were recorded in detail by the experi-

menter in a special protocol for the interaction of the participants.

The analysis of experimental protocols made it possible to identify and describe four specific types of child-adult learning interactions. The structural elements of such educational interactions were the processes of communication, reflection, mutual understanding and exchange of actions. The indicator of the formation of one or another *type of educational interactions* was the qualitative originality and a certain system of hierarchical links between these processes. In this regard, we had the opportunity to identify and describe both “horizontal” relationships between the various elements that make up a holistic education — a way of interaction, and “vertical” relationships that connect with each other through a certain continuity and interpenetration the types of learning interactions themselves. Let us dwell in more detail on each type of learning interactions we have identified.

**The pre-organizational type of learning interactions** is characterized either by the lack of communication between the participants and the adult, as well as between the participants, or single statements / appeals that do not affect the content of the problem being solved and do not aim to include the partner in the process of joint search for a solution. For example, statements of the following content were noted: “What if I do this?”, “What will happen if I add one?”, “I will try to put it here, what will happen then?” etc. Such statements are not addressed directly to a partner or an adult and are a manifestation of egocentric speech.

It is also worth noting the significance of the emerging egocentric speech, which, according to L.S. Vygotsky, shows the child’s awareness of difficulties in solving a problem and the emergence of processes associated with the search for ways to overcome such difficulties. Statements for themselves, which the participants demonstrated, were in this case nothing but a process of *reflection* arising and manifesting itself outwardly, i.e. the process of analyzing the possibilities of one’s own action in relation to the partner’s action in objectively changing conditions of the searching for a solution to the problem.

According to the results, the reflection of the participants was aimed, firstly, at correlating the implemented

Table 1

**The Quantity of Students in Classes of Primary Level of Education**

	Grade	
Grade	Quantity	Percent
1 <sup>st</sup> grade	10	23,8
2 <sup>nd</sup> grade	12	28,6
3 <sup>rd</sup> grade	14	33,3
4 <sup>th</sup> grade	6	14,3
Total	42	100

individual modes of action with the results of these actions (“What happens when I do this?”), secondly, at analyzing the partner’s action and its result. (“What happens when HE/SHE does this?”), to an analysis of the possibilities of correlating the results of one’s own action and the actions of a partner (What will happen if ME-HE will do this, and HE/HER will do this?). It was the emerging process of reflection that became the foundation of the subsequently formed mutual understanding between the participants. However, at this stage of the formation of the joint action of the participants, there was still no mutual understanding between them. This is due, first of all, to the fact that a special communicative task (as an attempt to evoke in a partner the same or similar ideas about the subject properties of the object of action), which mediates the process of solving the subject task, has not yet arisen for the participants. At the same time, the very communicative function of such statements did not disappear, but only did not become the subject of awareness of the partners, did not become arbitrary.

It is important to note the fact that if one of the participants uttered a statement for himself, this prompted the partner to pay attention to his next action, the result of this action and adjust his action to the changed objective conditions. These statements became a kind of equivalent of a pointing gesture: firstly, they began to organize the actions of partners regarding each other’s capabilities, and secondly, they drew the participants’ attention to the need to communicate with each other and coordinate individual actions. The difference between such statements and the actual pointing gesture here is that the latter usually acts as a deliberate act of influencing a partner.

In general, a situation, when the solution of the problem still remains for the participants the product of their individual action, but at the same time, for the first time, an uncoordinated attempt to focus on the result of the partner’s action appears, there is a prerequisite for the emergence of cooperation of individual actions, the transition of participants to the new – organizational – level of educational interactions. In this regard, the pre-organizational type of educational interaction can be characterized as a kind of “transitional stage”, the necessary basis for the joint action that is being formed between students, within which each of the subjects of the unfolding situation is faced with individual limitations and the need to find ways overcoming them.

**The organizational type of educational interactions** is characterized by the formation and implementation of those prerequisites that were outlined at the stage of the pre-organizational type of educational interactions. Purposeful communication appears between partners, which is indicative in nature, however, it does not express an “order” or “ultimate demand” to a partner, but a request

or advice to perform this or that action. Both partners begin to actively use non-verbal means of communication: a purposeful pointing gesture, imitations of actions, action-expectations, head nods, etc. The communication of the participants performs the regulatory function of the interaction process, while it acquires the character of arbitrariness. A process of reflection arises and develops, based on the participants’ careful observation not only of the results of their own actions, but also of the results of the partner’s actions. Participants try to establish a correspondence between the individual actions of each of them and their objective result.

The developing processes of reflection and communication become the basis for the process of mutual understanding that arises between the partners, determined, firstly, by direct observation of the results of the actions of each of the partners and the results of various ways of cooperating individual actions, and secondly, by communicative acts, through which the intentions and intentions of the participants are revealed and understood. A particularly vivid mutual understanding is manifested through the so-called “wow-effects”, when one of the participants, in response to an action or appeal from a partner, says: “Ah-ah ... I understand how you want ...” or “Exactly, I think that it will be exactly the same either (about the balance of weighs).

The developing processes of communication, reflection and mutual understanding allow participants to transform their character by actions to achieve a common result: instead of individual activity, consistently performed actions are recorded with an assessment of the result of each of them. This essentially distinguishes the pre-organizational type of educational interaction from the organizational one – in the changing and meaningfully transforming processes of communication, reflection, exchange of actions, as well as mutual understanding, the orientation of participants to the analysis of each other’s capabilities in relation to solving problems is manifested. There was a gradual transition of the participants from the analysis of the result of each individual action to an orientation towards joint action, based on an understanding of the common result as a way of cooperating individual actions. The structural ratio of the elements of the activities performed by the participants also changed. Thus, the individual actions of the participants, which earlier, at the pre-organizational stage, were aimed directly at solving the set task, here acquired the character of operations that form a larger unit – a joint action. It was the joint action, as a certain way of cooperating individual actions, that became for the participants a way of solving problems, while the movement of magnets around the installation and changing their number become operations performed based on the current situation.



However, it should be noted that a stable learning community between students has not yet emerged. This is due to the fact that the mutual understanding that arises between the participants is situational, largely random in nature, not associated with the deliberate coordination of the participants' individual ideas about the subject properties of the object of action, and the unfolding communication, although it performs a function that regulates the process of interaction, aimed at including a partner in a joint search for solving problems, does not affect the essential relationships that underlie the object under study. Nevertheless, as noted above, the type of educational interaction implemented by partners is a step forward in terms of developing their communicative and reflexive abilities and the educational activity itself in general, since they master and test new models of organizing learning and cognitive actions that are not available for them earlier in the framework of individual activities.

The next step is carried out by students who demonstrate a **reflexive-analytical type of learning interactions**, which is characterized by a change in the subject of the task solved by partners in joint activities. In this case, the very method of interaction became a subject for the participants, the analysis of which mediated the solution of a specific practical problem. Such features of the reorientation of participants from the analysis of the results of individual action or from simple cooperation to the identification of significant relationships between individual actions and, through them, the factors of balance, were manifested in the unfolding processes of communication, reflection and exchange of actions. Thus, communication took on the form of a discussion by the participants of the individual understanding of the subject properties of the object being transformed, ways of coordinating and interconnecting individual actions, ways of interaction, through which a stable mutual understanding developed. Reflection, previously based on direct observation of the results of individual actions of partners, as well as the product of joint action, at this stage included the very method of interaction as its subject and its relation to the identified objective characteristics of the object of action. Due to this new content, reflection became a means of modeling the essential relationships inherent in the phenomenon under study, and communication and exchange of actions became, respectively, the means of organizing and controlling the verification of this model. The object of reflection of the participants in this case was not the private relations of the elements of the problem being solved to the individual manifestations of the object in a given situation, but the essential relations revealed through the analysis of their manifestation in the realized ways of interaction with the partner.

The features of communicative-reflexive processes revealed in the study also determined the transformation of the very nature of the joint activity: for the participants,

their individual actions ceased to exist as independent units and were not perceived outside of the joint action. When one of the participants began to perform his action, his partner, as it were, "adapted" to him, performing his action not sequentially, as in a cooperative community, but in parallel with the partner. Such a merging of the partners' actions indicates: 1) the emergence of the joint action that is inseparable into individual operations, 2) the emergence of a common emotional and semantic field of the joint action of the participants, when each of the partners co-experiences a moment of mutual understanding with a "like-minded person", i.e. a general understanding of the objectivity in the objective situation of the task and the possible action of the partner, aimed at achieving a common goal.

The way of interaction as a specific subject of analysis, as well as the communication and reflection arising on this occasion, become for children, according to the results, the basis on which the whole situation of the joint activity is built. Moreover, it is here that the activity acquires the content of the *learning* in the full sense of the word due to the fact that the participants reproduce and model the content of essential subject relations, acting as a special *collective subject*. At the same time, within the boundaries of this collective subject, each of its participants fully retains its personal subjectivity, independence and initiative. The personality is not lost or blurred in the abstract content of some kind of "over-personal" formation, but, on the contrary, it fully manifests its active essence, overcoming the boundaries of the zone of proximal development. In this regard, it is worth recalling once again how L.S. Vygotsky defined the concept of the "zone of proximal development" — this is what a child cannot yet do on his own, but what he is capable of under the guidance of an adult and in cooperation with him. What a child can do today in cooperation, tomorrow he will do on his own. The most important (and perhaps hidden) message of this idea is that the child does not master specific knowledge (a specific task, example, operation), but the way of organizing his activity, embedded in the way the child and adult, child and peer, in connection with which it becomes possible for him to solve/perform a whole spectrum of previously inaccessible tasks.

The obtained research data fully confirms precisely this idea: by implementing and developing the processes of communication, reflection, exchange of actions and mutual understanding in the process of solving problems and encountering restrictions set by adults, the students model, test and master new ways of educational interactions, which subsequently, in the process of internalization, are transformed into individual methods of educational and cognitive actions. In particular, this also applies to the communicative-reflexive abilities of students: it is these processes that become the main means of constructing a situation of productive educational interactions.

### 5. From Pre-educational to Educational Community: Trends in the Development of Communicative-reflexive Processes in the “Zone of Proximal Development”

In the course of the experimental study, it was found that the development and formation of educational interactions in the educational community are based on the processes of communication and reflection that arise and qualitatively change as a result of the collision of participants with specially set difficulties and individual limitations. When we say “learning community”, we mean by this term socio-psychological education (“integrity”), which is characterized primarily by the orientation (focus) of the subjects of the joint activity to identify essential relationships, patterns of functioning of the object/phenomenon under study (i.e. on the solution of a learning problem) through the analysis of the methods of interaction with each other, disclosure of the relationship of individual actions and design of the trajectory for solving a certain class of problems through the joint action being built. This orientation is based on a common emotional and semantic field emerging between the subjects of the joint activity, characterized by “co-experiencing” the situation of mutual understanding with others, sharing the goals and motives of the joint action. Such a motive for partners in the joint activities is the coordination of individual actions with a partner and the construction of a field of possible actions in the context of changing conditions of the activity.

It is in this respect that it is important to consider the role of communication and reflection, acting, on the one hand, as *processes* that ensure the transition of participants from the pre-learning community (pre-learning type of interactions), when they are oriented primarily to the situational features and properties of the object being studied and the possibilities of individual action, to the actual *learning community* (learning type of interactions), on the other hand, as an emerging ability, i.e. as a result of the emergence and functioning of such a socio-psychological education. So, at the first stages of solving experimental problems, it is still impossible to say that students actually solve the learning problem. At the forefront, the possibilities of their individual action appear for the participants, the attempts to solve the problem “on their own”, the reflection of the participants is mainly aimed at establishing a correspondence between the direction of their own action and its specific result without establishing the relationship of this result with the partner’s action. Communication as a means of ensuring the exchange of actions, planning ways to jointly search for a solution to the problem does not yet arise, remains involuntary, goes, as it were, in the “background”; it is not fixed and is not specially distinguished in the interaction. Nevertheless, the communicative function of statements is not lost, it begins to be realized by

the participants when they are faced with the impossibility of individually solving problems and overcoming the difficulties that arise. Arising as a purposeful process, communication, in turn, ensures the transformation of other components of the emerging community: reflection, mutual understanding, exchange of actions. So, the predominance of “speech for oneself”, egocentric statements is connected in this case with reflection on one’s own actions and their results. This is also a plan of individual activity, orientation in the conditions of the task and the situation itself.

With the emergence of purposeful, arbitrary communication as a necessary condition for overcoming conscious limitations, the direction of reflection also changes: it acquires a bidirectional character. Firstly, due to the constantly changing conditions of action, each participant continuously analyzes and establishes a connection between an individual action and its result, and secondly, they begin to analyze the relationship between each other’s actions and their influence on the joint result. This is facilitated by the very form of communicative acts. For example, when solving problems of the “Scale” method, the following communication was recorded:

Participant 1: “You put it here.”

Participant 2 (performs an action requested by a partner).

Participant 1: “And then I will do this” [24].

The action of one participant led to a change in the conditions of the action of the other, which was recorded by his partner and became the subject of reflexive analysis. There was a reorientation of participants from individual activity to cooperation of individual actions. However, the motive for their actions still remained the direct solution of a specific practical problem, since in terms of content, neither communication nor reflection were yet aimed at analyzing the relationship of their action with the action of another as a way to find a solution to all problems of this class. The participants have not yet set themselves a research task, including the search for essential conditions of action.

In a situation where the participants discussed the very method of combining individual actions and the intended product of this joint action, we can talk about the emergence of a new type of community – the actual learning community. This type of generality (reflexive-analytical) is in many ways reminiscent of the research activity of scientists: children put forward their own assumptions (often in the form of “brainstorming”), discard some of them, and empirically test the remaining assumptions. The next stage is the discussion of questions why such and such methods of combining individual actions turned out to be wrong, and this and that method was correct, the search for a relationship between the nature of the joint action and the laws of functioning of the subject of the action.

In this case, the processes of reflection also acquired a special quality: the participants are no longer simply trying to establish the relationship between objective actions

and their product, but are trying to understand and analyze why each of them sees the object of action from this and not another side. The subject of their analysis is the results of the reflection of the other, the understanding of the other about the object/phenomenon under study: “I think that you understand it this way, while I understand it that way. Why do we have different ideas? It is here that the actual learning situation arises: the knowledge of the object jointly and through another, the study of one’s own ideas through the prism of the partner’s ideas and, on this basis, the search for common points of contact – mutual understanding.

In this type of community, the processes of reflection, which are an internal component of the cognitive activity of the individual, become the subject of communication between partners. Analyzing and discussing various ways of interacting with each other and building a trajectory of action within the framework of the task in relation to each other’s capabilities, the participants, thereby, reproduce and model the content of the objective relations that are essential for the task. In such a process of transition of participants to the solution of the actual learning problem in the learning community, the formation of communicative and reflective abilities of students takes place.

### Conclusion

1. The concept of “Zone of Proximal Development”, introduced by L.S. Vygotsky to substantiate the idea of the leading role of education in child development, acts in modern psychological and pedagogical science as a powerful methodological basis for building the practice of developmental education.

2. The implementation of the main ideas and meanings potentially embedded in the concept of the zone

of proximal development has been consistently implemented in the system of developmental education by D.B. Elkonin-V.V. Davydov and his method – learning activity. Within and on the basis of the learning activity, the main growth of younger schoolchildren is formed: the ability to learn and theoretical thinking.

3. Modern studies of joint learning activities open up new opportunities for identifying the psychological conditions for constructing the zone of proximal development of personal learning results – the reflexive and communicative abilities of children aged 6–10 years.

4. Experimental studies of joint activity as a zone of proximal development of reflexive and communicative abilities of younger schoolchildren revealed three types of interaction in the process of searching for and identifying a common mode of action in a situation: pre-organizational, organizational, reflexive-analytical. Each of these types of interactions is characterized by a qualitatively specific way of implementing communicative and reflexive actions.

5. Each type of interaction in a joint activity corresponds to a certain community of its participants. The actual learning community arises at the reflexive-analytical level of interaction between participants in a joint action, when the results of the reflection of another, the understanding of the situation by the others and the actions in it, discussion and coordination with the other of joint actions become the subject of their analysis. This is where the learning situation appears: the knowledge of the object jointly and through another, the study of one’s own ideas through the prism of the partner’s ideas and, on this basis, the search for common points of contact – mutual understanding. It is possible to speak about the functioning of communicative and reflexive actions as abilities only at the reflexive-analytical level of their development in the educational community.

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