

Zone of Proximal Development, Scaffolding and Teaching Practice

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The construction of the zone of proximal development (ZPD) in the context of teaching activity is discussed in the paper. ZPD is compared and contrasted with the concept of scaffolding as introduced by Jerome Bruner. In the context of its potential for operationalisation in the form of teacher activities, the author examines key ZPD content given by Lev Vygotsky in terms of the complex interaction of spontaneous (everyday) concepts formed prior to the beginning of school education with scientific (theoretical) concepts formed during schooling. Vygotsky's main idea about the leading role of scientific concepts in the restructuring of previously formed spontaneous concepts, as well as in the development of the child's holistic thinking, leads to the conclusion that it is possible also to directly influence the spontaneous formation concepts change through the organisation of collectively distributed forms of educational activity and in a polylogue based the Socratic method. The leading psychological processes, which ensure the development of spontaneous concepts through their greater generalisation and awareness, comprise the processes of exteriorisation of spontaneous concepts, reflection and subsequent interiorisation of a collectively constructed concept. Therefore, the activities of teaching in constructing a ZPD include providing conditions for the distribution of individual operations in the course of a joint learning action and facilitating a polylogue to ensure the effective functioning of these psychological processes in the course of specifically organised learning activities.

Keywords: zone of proximal development, scaffolding, cultural-historical psychology, Vygotsky, teaching.

For citation: Margolis A.A. Zone of Proximal Development, Scaffolding and Teaching Practice. *Kul'turno-istoricheskaya psikhologiya* = *Cultural-Historical Psychology*, 2020. Vol. 16, no. 3, pp. 15–26. DOI: <https://doi.org/10.17759/chp.2020160303>

Introduction

In the context of child development, one of the most cited concepts in Lev Vygotsky's cultural-historical psychology is the zone of proximal development (ZPD). ZPD continues to arouse research and practical interest due to its role in constructing a model of education that is aimed at developing a student's thinking and personality rather than memorising and reproducing information [7].

Figs. 1–2 present the number of publications per year on the topic of ZPD in the international (Web of Science Core Collection, WoS CC) and national (Russian Science Citation Index, RSCI) abstract databases of scientific publications in 2000–2019.

The total number of publications in the Web of Science Core Collection referencing the ZPD concept for the period 2000–2019 was 830.

As can be seen from Fig. 2, the total number of publications in the Scientific Electronic Library eLibrary.ru, containing the concept of the zone of proximal development (ZPD) for the period 2000–2019 accounted for 2600.

However, there are only few practical examples of the implementation of the ZPD concept in in educa-

tional practice. The list of successful attempts to create such a learning model consists of the system of developmental education developed by Daniil Elkonin and Vasily Davydov for elementary school students, and a number of preschool education curricula based around ZPD include "Development" (*Razvitiye*), "Golden Key" (*Zolotoy Klyuchik*) and "Tools of the Mind". The attempt at a mass transition to an activity-based methodology aimed at developing the thinking and personality Russian school pupils as part of the development of a new state standard for general education (2009) did not yield the desired transformation. "Traditional" subject teaching, based primarily on training pupils' memory capacity, continues to be carried out in the majority of classes in Russian schools, while genuine goals of education are reduced to the need to pass the unified state exam. Such results naturally raise the question as to why previous attempts to introduce ZPD development-based approaches into education have mostly been unsuccessful.

In our opinion, the answer to this question is connected, first of all, with the fact that neither Vygotsky nor his followers offered a clear and understandable (specifically to teachers) model of teacher activity to construct

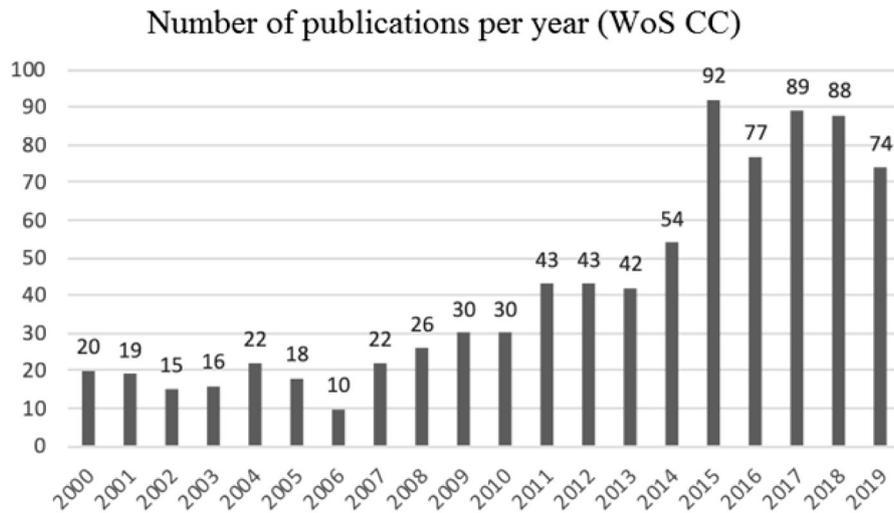


Fig. 1. Number of publications on the topic of ZPD in 2000–2019, Web of Science Core Collection (WoS CC)

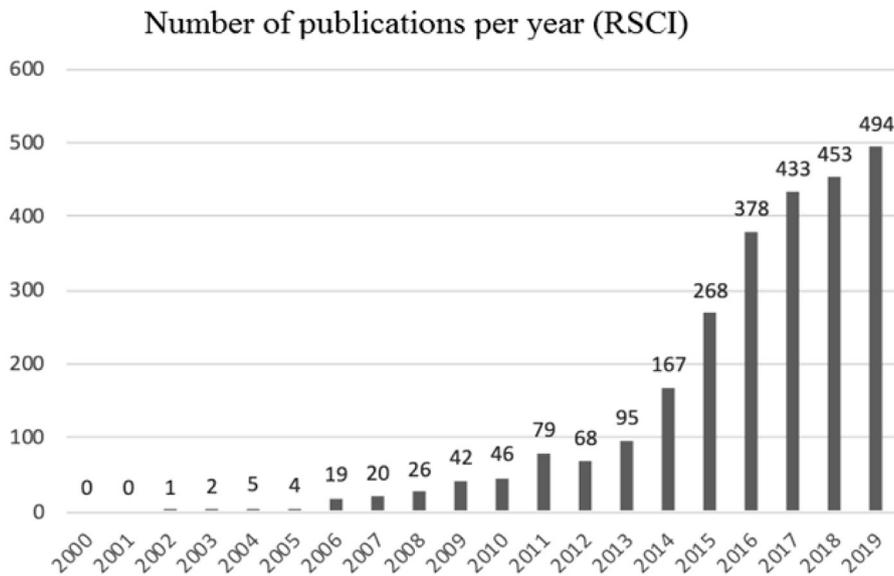


Fig. 2. Number of publications on the topic of ZPD in 2000–2019, Russian Science Citation Index (RSCI)

a ZPD. Instead, ZPD tends to be described mainly from the perspective of the student's development, rather than the teacher's actions. Thus, developing a model of teacher activity aimed at creating the ZPD is a key task that largely determines the successful implementation of the idea of development in school education.

Zone of Proximal Development: concept description

The ZPD concept can be considered in terms of "... the distance between the actual level of development as determined by independent problem solving and the level of potential development as determined through problem-solving under adult guidance, or in collaboration with more capable peers" [3]. ZPD was first introduced in the works of Lev Vygotsky at a relatively late period from 1932 to 1934. Various definitions of the

concept given in a series of lectures during this period in Moscow and in Leningrad, as well as in several major works published during his lifetime and later included in other publications [5], do not always coincide with each other. This is partly due to the fact that Vygotsky's scientific thought never stood still, but rapidly developed in accordance with his own understanding of the equivalence between a scientific concept and the meaning of a word. Here, his most important thesis was that, at the initial moment formation of meaning, the process has not terminated, but, on the contrary, has just begun. On the other hand, this issue is also associated with the process of involving a new concept in an increasingly complicated list of contexts and processes studied by Vygotsky, inevitably leading to the incorporation of the ZPD concept into a more general system of concepts in cultural-historical psychology. As a result, the meaning of the ZPD concept changes depending on its place in this system of concepts and in the description of various

processes and objects studied within the framework of the emerging cultural-historical theory.

If, instead of focusing on the chronological line of development of scientific research that led Vygotsky to formulate the ZPD concept, we trace the logical sequence of the development of his scientific ideas, the appearance of the concept of the ZPD can be simplistically represented as a result of studying the following interrelated set of research subjects and related inferences.

1). Theoretical study of the processes of development and transition from already established, matured psychological functions to those that are in the process of being formed and therefore are not observable in the present, but may become observable in the near future.

2). Locating the functional development mechanism in the cooperation of a child with an adult and in processes of imitation.

3). Experimental study of processes of meaning formation and the development of understanding, which support the possibility of cooperation with an adult and the further development of a child in the directions proposed by an adult, while the speed of this development is determined by the individual possibilities of meaningful imitation.

4). Diagnostics of different levels of possible cooperation with adults as different opportunities for meaningful imitation, and, consequently, different levels of development of still-emerging and developing functions along with the determination of the development potential of different individual students. The task here is not to diagnose what is already the result of previous development processes, but rather to analyse what is just emerging (the future stage of development, which most of the traditional tests “do not grasp”), and what can be influenced in the learning process.

5). Study of the relationship between everyday and scientific concepts as a projection of the problem of the development of meanings in the course of cooperation with an adult and the particular case of a more general relationship between development and learning.

6). The study of the ZPD from the point of view of what can be influenced in the transition from a laboratory and experimental situation to the practice of schooling rather than in terms of the phenomenology of developmental processes and analysis of those processes that determine its regularities.

It was here that Vygotsky the theoretician, who considered development from the point of view of a general

methodology and analysis of the development of psychological systems – and (later) an experimental researcher who studied the process of forming concepts and meanings (the Vygotsky-Sakharov method of double stimulation) – was replaced by Vygotsky the practicing researcher trying to understand not only how it works, but also how it could be organised within the framework of Learning as a social institution (the study of complex processes of interrelation between previously-formed everyday concepts and scientific concepts formed in the course of organised school education). This also includes the study of the role of play as an activity aimed at developing the most important components of a child’s psychological functions, including those necessary for his or her next stage of development and learning.

In the context of the present work, it is this part of Vygotsky’s works expressing his ideas about the relationship between everyday and scientific concepts that are of maximum interest to us in the context of understanding the role of the teacher and the specifics of his or her activities in the process of organising education on the basis of the ZPD concept. It should also be noted that, although this particular part of Vygotsky’s work did not attract much interest among researchers associated with Cultural Historical Activity Theory (CHAT), its remarkable popularity among practicing teachers led to a rather somewhat simplified consideration of how the concept of the ZPD can be understood and made to “work” in education practice.

The various explanations of the concept of the ZPD addressed to teachers basically boil down to a simplified view of the ZPD as a special type of assistance provided by a teacher to a pupil to help solve tasks that the child cannot solve on his or her own. Such recommendations often take the form of video materials made available on the Internet (Table 1).

Most of these videos end with a positive and encouraging statement that the organisation of this type of assistance (the specific content and organisation of which, as a rule, are not disclosed) promises success in teaching, understood as gains on the part of students in terms of the ability to solve similar problems on their own in the next step of their learning. In fact, such an application of ZPD with direct references to Vygotsky and cultural-historical theory comes down to the need to provide timely assistance to a child facing difficulties in solving tasks on his or her own. Even given the apparent triviality of this statement and the intuitive agreement of most

Table 1

**Examples of videos on the concept of the zone of proximal development
 (according to YouTube, data as on June 22, 2020)**

| No. | Title of the video | Views | Link (URL) |
|-----|--|---------|---|
| 1 | 2 | 3 | 4 |
| 1 | Vygotsky’s Zone of Proximal Development | 337 000 | https://www.youtube.com/watch?v=0BX2ynEqLL4 |
| 2 | Vygotsky’s Theory of Cognitive Development – ZPD, Scaffolding, MKO (Psychology Theories) | 385 967 | https://youtu.be/MluvBAtv8oo |
| 3 | Zone of Proximal Development | 141 850 | https://youtu.be/7Im_GrCgrVA |
| 4 | Zone of Proximal Development | 104 729 | https://youtu.be/rX8lRh1u5iE |
| 5 | Zone of Proximal Development | 84 000 | https://youtu.be/Du6vqSOj7UU |

of the teachers with this thesis, it is supported by scientific justification in the form of the ZPD concept, in fact, transforming the latter from a deep and complex scientific concept into an Internet meme.

Scaffolding: a way of constructing the ZPD or an independent concept outside of cultural-historical psychology?

The professional activities of a teacher aimed at assisting students in the process of solving learning problems have been repeatedly exposed to scientific scrutiny.

One of the best-known empirical studies of problem-solving processes engaged in by students in the context of guidance from a more experienced partner (i.e. another student) or adult was carried out by Jerome Bruner and his colleagues in 1976 [28]. This resulted in the concept of *scaffolding* (literally a temporary structure erected to help with the building or modification of another structure), denoting a special type of support given by a teacher to a student when performing a task that the latter might otherwise not be able to accomplish.

According to Bruner, such tasks, whose major attributes are specific to human activity and communication, are engaged in almost from the moment a child is born. This applies both when problems are solved during the learning process and through special actions undertaken by adults or more skillful peers to help the child in solving such problems. Bruner et al. argue that such actions do not occur, for example, in primates, where, although young individuals can observe the demonstration of certain behaviors, they are not involved in collaboration under guidance in solving the problems that are initially beyond their capabilities.

Bruner et al. argue that a child's capability to solve a problem with the help of an adult that could not be solved unaided emerges due to two important circumstances. Firstly, this occurs due to the adult's "controlling" of those elements of the task that are initially beyond the learner's capability, thus allowing him or her to concentrate upon and complete only those elements that are within his or her range of competence. As a result, the child may later develop an independent problem-solving capacity to an extent that greatly exceeds the previous capability. Secondly, the condition for this possibility is the need to comprehend the solution method, which may precede the very implementation of such a method. In other words, the child must come to an understanding of how the problem can be solved before the conditions for the implementation of the sequence of actions leading to its solution appear.

The process of comprehending the correct decision by comparing the means and the necessary results enables a child to distinguish good problem-solving strategies from bad ones under circumstances in which the child cannot develop his or her own good strategy. According to Bruner, the ability to "recognize or comprehend" a so-

lution prior to its independent implementation relies on the child's orienting and experimental activities, in the process of which he or she tries to find the connection between the present conditions and the required result and build his or her understanding of the way to solve the problem. This searching process, according to Bruner, may require the support of an adult as an "activator" of the child's cognitive activity, who, depending on the specific conditions of collaboration with the child, implements one of the following functions.

1. Recruitment (gaining and maintaining the child's interest in the task).

2. Reduction in degrees of freedom (DOF)¹, i.e., a decrease in the complexity of the task to a level at which the child can act independently.

3. Maintenance of direction (keeping the goal of solving the task).

4. Marking critical features, including differences between the intended and achieved result of the child's action (in fact, this is one of the most significant functions associated with setting the conditions for the child to reflect on his or her actions).

5. Control of the child's level of frustration in the process of solving a problem, which comprises an important aspect not only in terms of cognitive guidance of a child, but also as motivational-affective measurement of cooperation with him.

6. Demonstration or modelling, which is considered not as showing a ready-to-use model of solving a problem by an adult, but rather as a means of idealising and highlighting a general way of solving: this can also include idealising (objectifying) the action approach (attempts at solving a task) carried out by the child him- or herself. Along with the marking of the critical features of a task, modelling creates the necessary conditions for the child to realise that his or her mode of action is different from the required one, thus facilitating the development of the child's independent action.

Having gained significant popularity since its introduction by Bruner et al. in 1976 (Fig. 3), the scaffolding concept came to be perceived as a particular way of constructing the ZPD. This perception was not inhibited by the omission of such a connection in Bruner's work, whose bibliography did not mention any of Vygotsky's works. However, following its appearance in the work of Courtney Cazden (1979) [9], the apparent connection between these concepts was explored in the work of an increasingly significant number of researchers [20].

Over time, the use of the term "scaffolding" in various contexts has become so profuse that, according to a number of researchers, it started being used synonymously with any kind of support provided to a student in the learning process [16]. As a consequence, its applicability in educational research has become very controversial [15]. One attempt to systematise the results of studies on the concept of scaffolding is presented in the work of Janneke van de Pol [25]. This systematic review cov-

¹ Concept developed by Nikolai Bernstein

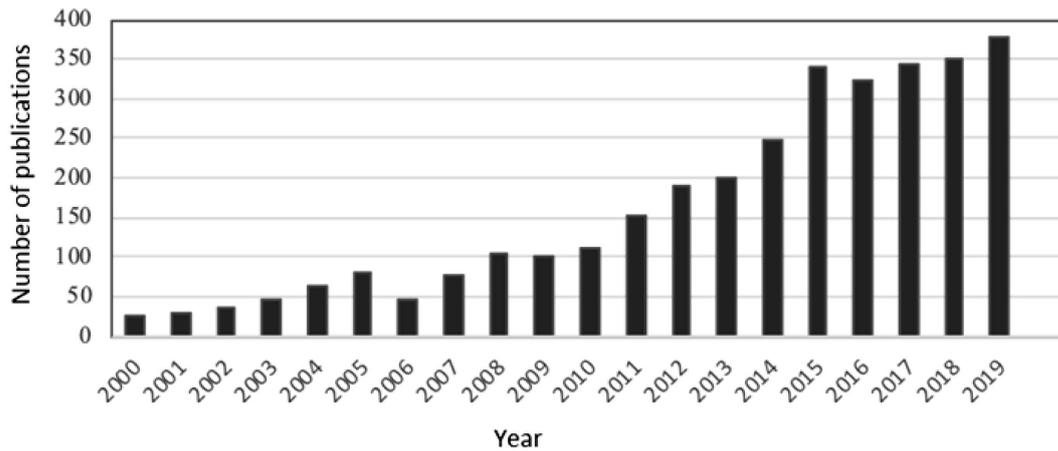


Fig. 3. Number of publications on scaffolding in 2000–2020, Education, Educational Research and Psychology sections, Web of Science CC

ers 66 articles published in indexed databases between 1998 and 2009, including 8 studies aimed at evaluating the effectiveness of learning through scaffolding. The authors of the scrutinised articles argue that, despite the fact that no consensus exists with respect to the definition and understanding of scaffolding in the professional community, some clearly common characteristics shared by most researchers can be distinguished.

The first general characteristic of scaffolding can be referred to in terms of “limited or *adjusted support*”, usually understood as providing the students with teaching support to the extent necessary for them to successfully solve a learning problem in cooperation with the teacher. Here, the teacher’s support should either be at the same or a slightly higher level as the current level of the student’s performance. The different nature and scope of the assistance provided by teachers is based on diagnostic data and evaluation of school pupils’ actions in the process of independent problem-solving. Such support is not just differentiated, but it seems to be adjusted to the student or built on top of his individual action. Since the differentiation of this type of assistance to different children is based on the results of diagnostics organised in the process of joint activity, many authors mention a direct and immediate connection between the concept of scaffolding and such concepts as *dynamic assessment* [10; 11; 15; 21], *formative assessment* [25] and online monitoring or *online diagnosis* [14].

The second shared characteristic relates to the essence of the “scaffold metaphor as a temporary structure erected to help with the building or modification of another structure”, understood as the provision of adult support to the student, which in the process of joint solving of a learning task will fade to the point of complete withdrawal (just as the need for scaffolding disappears with the construction of a building).

The process of reducing the amount of teaching support required by the student and its gradual withdrawal or *fading* from the space of joint action with the student is strongly related to the third common characteristic of the scaffolding concept shared by most researchers, namely the transfer of responsibility for joint action

implementation and control over the problem solution from a teacher to a student.

Investigating the content of psychological processes unfolding within the framework of scaffolding, a number of authors analyse the processes of interiorisation of the provided support [20], development of mutual understanding or *intersubjectivity* [14, 16] and the formation of shared meaning [22].

According to Van de Pol [25, 2010], analysing the scaffolding concept provides the possibility to create three different classifications on its basis. One such classification, which is based on the description of various means and techniques of adult support provided to a student, comprises six main types: modelling, adjustment/calibrating of the required level of support, providing feedback, instructing (demonstrating), questioning and cognitive structuring (decomposition) of the problem being solved [23].

The second classification, based on the description of the teacher’s functions in the framework of joint action with the student, is given in the original work of David Wood [28] (as described fully above) and includes: recruitment, reduction in “degrees of freedom” of the student’s action, maintenance of direction, marking critical features, control of student frustration and, finally, demonstration of a model of the correct performance of the action.

Another classification of the teacher’s actions in the process of guiding the student in the framework of joint actions through scaffolding was offered in the works of Joyce Many [12] and Elaine Silliman [17]. This classification is connected with the distinction between the means by which such guidance is provided and the goals or intentions that the teacher sets for him- or herself.

The integrative framework obtained through a combination of six types of means (techniques) and five types of goals (Table 2) can be an effective tool for analysing both the content of the teaching guidance provided to the student within their joint action, as well as the direction of such guidance.

Any combination of scaffolding means with scaffolding intentions can be construed as a scaffolding strategy

Analysis of scaffolding strategies (Van de Pol et al, 2010)

| Scaffolding goals | | | | | |
|---|--------------|--|------------------------------------|----------------------------|---|
| Support for metacognitive performance of students | | Support for cognitive activity of students | | Support for student affect | |
| A. Directions of support | | B. Cognitive structuring | C. Reduction in degrees of freedom | D. Recruitment | E. Contingency Management / Frustration Control |
| Means | | | | | |
| Feeding back | Giving hints | Instructing | Explaining | Modelling | Questioning |

as long as three general conditions for this type of support are met (limitation, gradual reduction and transfer of responsibility). Although most researchers focused on describing and theorising scaffolding, some of them studied the effectiveness as well. In general, they all showed positive results. Further studies aimed at assessing the effectiveness of scaffolding should be associated with solving a number of difficulties arising in this case [25].

The first and possibly most important problem is that the three key characteristics of this type of cooperative assistance cannot be completely separated from one another. The teaching support, adjusted and adapted to the current level of the student's performance and action limits, decreases and "fades away" as the student's individual actions expand, leading to a gradual transfer of responsibility and control over the implementation of joint action from the teacher to the student. Thus, one feature actually "flows" into the second, and the second into the third. In this regard, it is the first feature that turns out to be the most important due to its role in causing the further chain of joint action transformations to arise [25].

The second problem lies in the attempt to assess the effectiveness of this type of teaching action. To account for these, the need to take into account not only the characteristics of the student's actions and personality, but also his or her behaviour patterns when interacting with the teacher and type of communication, significantly complicates the choice of proper assessment tools.

An additional difficulty that arises with such an assessment approach consists in the need to take into account and describe in detail the context of teacher-student interaction. This can also exert a significant impact on the effectiveness of the teacher's actions in the enactment of scaffolding strategies [25].

Criticism of the scaffolding technique

At the same time as the scaffolding concept was gaining in popularity, the number of researchers criticising the use of this metaphor in general – and its correlation with the concept of the ZPD in particular – grew. Much of this specific criticism revolved around two main positions:

- although scaffolding is used to represent the implementation of ZPD in training practice, it is understood too narrowly and fails to fully take into account the rich meaning of the ZPD concept;
- scaffolding is not directly related to ZPD, since the former is about Learning, while the latter is about Learning and Development.

According to Irina Verenikina, the reason why the scaffolding metaphor became so widespread among both researchers and teachers is due to its close relationship with the latter's intuitive ideas of what effective learning is, i.e. understood as providing structured support to children in the process of solving training tasks. At the same time, the metaphor appeared to be too broad, becoming, in essence, an umbrella term for the provision of teachers with clear and explicit instructions that help them to ensure the practical development of students in their learning process [26].

Moreover, due to its consideration outside the context of cultural-historical theory, the concept of scaffolding is generally considered as a teacher-initiated, directive instructional strategy, which conflicts with the initial understanding of teaching as *inter*-action of the teacher and students to build new knowledge together. Some enquirers even consider this concept as a regression to an era prior to Piaget, whose research revealed the very significant role of the activity of the child himself in the process of shaping his or her own development [20].

Thus, scaffolding is often criticised as being an excessively narrow way of operationalising the concept of the ZPD due to its focus on the disadvantages of dominant teacher actions, whereas Vygotsky's focus remained on the joint actions of children and adults. This leads some researchers to the conclusion that, despite some correlation, the scaffolding metaphor fails to capture the essence of Vygotsky's ZPD concept, inappropriately representing the interactions of two actors as a one-sided influence on the part of the teacher ("a street with one-way traffic").

According to Verenikina [26], such a view may be explained in terms of Vygotsky's cultural-historical theory having appeared in a wide professional discourse after an earlier popular representation of a child as an active builder of his/her own development carried out in the course of numerous discoveries in the process of his interaction with the environment. This cognitive or individual constructivist point of view associated with the works of Piaget that appeared before the works of Vygotsky, whose emphasis is placed on the role of social interactions mediated by signs (social constructivism), formed a stable attitude on the part of most researchers that the source of a child's development consists, first of all, in his or her active interaction with the environment. In this context, any interaction with an adult – especially with a teacher, who is a truly active participant in their joint action (and not only the authors of the term of

scaffolding think so, but also Vygotsky himself) — can be considered as a limitation of the child's activity, immediately coming into conflict with the previously formed views of the researcher in line with Piaget's theory. Nevertheless, in the opinion of the present author, this does not necessarily contradict the position of cultural-historical theory.

From this point of view, the criticism of the concept of scaffolding appears to be curious because it illustrates the fact that previously formed spontaneous notions do not disappear completely within the framework of children's development from the beginning of concept formation in the course of the organised learning; moreover, even the researchers' previously formed notions of the processes of the development of these concepts in children do not disappear, entering into complex relations with the new ideas, whose balance never exactly coincides with the authors' understanding of these new ideas. It would seem that the more urgent this problem of synthesis of old and new scientific concepts is, the less defined and more metaphorical these new ideas become, as seen in the case of the concepts of the ZPD and scaffolding.

An attempt to reveal the content of a metaphorical object (ZPD) through a metaphorical description of actions in it (scaffolding) should initially lead to a significant level of uncertainty and a wide variety of interpretations up to incredible simplifications and inversions in understanding the key ideas that the authors of the terms put on in the form of the metaphors under consideration.

Peter Smagorinsky articulated another strong position regarding the concept of scaffolding as having no direct relation to the concept of the ZPD [18]. In Smagorinsky's opinion, one of the reasons for the prevalence of the extremely simplified understanding of the concept of the ZPD by teachers and its identification with the scaffolding method is the aim of individual teachers and schools to obtain rapid positive results under the conditions of ongoing internal and external accountability evaluations. Many researchers have a literal rather than metaphorical, understanding of the ZPD, according to which a student will be able to act effectively and independently *tomorrow*, if he or she is provided with properly organised support today.

Expanding on Smagorinsky's critical ideas, we note that one of the most important differences between the ZPD and scaffolding concepts is that the dimensions (primarily, the *time* dimension) of these concepts turn out to be completely different. The duration of interaction and existence of scaffolding as a specific (albeit very complex in structure, form and purpose) adult support to a pupil in the process of solving a learning task is limited by the duration of its solution. Thus, the *time* characteristics of the ZPD are by no means determined or limited by the parameters of time spent on a joint solution of a specific task with an adult or even a whole series of such tasks. Rather, the time span of ZPD is determined exclusively by the speed of development processes and those social interactions that pave cultural or "artificial" ways for this development, mediating them with various sign-symbolic means that transform both the content and directions of infant thought development. To sum up this

remark, we can conclude that the time characteristics of scaffolding appear to be much shorter, being determined by the time of solving the task with adult support. In other words, since the period of ZPD existence is determined by the rate of maturation of the child's capabilities and the level of influence of the adult and culture on this process, it is a significantly longer process. From this point of view, we can say that a direct comparison of scaffolding and ZPD looks incorrect to a certain extent, since in one case we are comparing problem-solving performance with the help of an adult, and in the other, a complex process of the development of psychological functions under conditions of social interactions mediated by signs.

Following Luis Moll, Smagorinsky points to another essential feature that is often overlooked in the process of elaborating the ZPD concept through such a literal understanding of the "tomorrow" metaphor, comprising the role of social context in the construction of a ZPD [19]. From his study of aspects of educational processes of migrant children, Moll came to the conclusion that their previous social and cultural experience (largely different from that in the United States) played a significant role in interacting with their teachers [13]. This conclusion, which correlates with the concept of cultural means, directly coincides with a much deeper understanding of what is mastered by pupils in the framework interactions with teachers. The result of mastering, obtaining and comprehending such means largely depends on the social context, including the past experience of students. According to Smagorinsky, the child's past — especially social and cultural — experience has a significant influence on the process of generalisations. As a matter of fact, while the research carried out by Vygotsky and his colleagues emphasised understanding of the past, as previously-formed everyday concepts, the formation of which took place in a different social context outside the organised learning, Smagorinsky and Moll mainly focus on previous cultural context and experience, which has the experience of another social or ethnic group affiliation, rather than individual childhood experience. To summarise the position of many of the researchers [27] described above, we shall note that the scaffolding method, being a fairly effective method for solving a number of professional challenges and involving the teacher's structured and limited support to students in the process of solving learning tasks, does not have a direct relation to the ZPD concept or its implementation in professional practice. Neither the way of organising the students' learning activities in accordance with the notion of ZPD, the processes of interaction between the teacher and students, nor the chronotope of such interaction (its correlation with the time dimension), coincide with the way it is described through the scaffolding method.

In Russia, the concept of scaffolding, never the subject of much enthusiasm among researchers and educators, played an insignificant role in bringing together the concepts of learning and development. However, if we look at another example of the development and propagation of the concept of "developmental education", which is close in meaning, we can see an almost identical mechanism of transforming an ac-

tual pedagogical practice into a formal-developmental, but, in fact, still a traditional one. As in the case with the concept of scaffolding, a large number of teachers, who had become acquainted with Elkonin and Davydov's ideas of developmental education, but who had not entirely mastered the in-depth essence of this approach, shortly after argued that they themselves used the elements of developmental education. However, behind this mechanism is a lack of a clear description of professional activities aimed at the development of students (irrespective of whether it is the construction of the ZPD of an individual or the development of the whole class within a specific program of subject teaching), as well as the formal nature of the professional generalisation itself, carried out by the teacher in the course of mastering new professional practices. Typically, it is only the external characteristics of the new approach to professional actions that are "captured" by the professional concepts formed within this process and recorded using the same term used by the developers in scientific literature. Due to the content of this notion being subject to dramatic transformation and simplification, it is often transformed into something opposite to its original meaning.

The same idea is stated in Smagorinsky's paper, in which the training of future teachers is analysed. [19]. The author's most important conclusion is that the traditional model of teacher education is disadvantaged by too little emphasis on theory rather than practice which is usually stressed. This means that, while the graduates of such programs master necessary professional knowledge, it is not at the level of concepts, but, at best, at the level of complexes similar to those levels of the development of children's ideas proposed by Vygotsky.

On the other hand, the way in which most teachers are introduced to the new content of the concept practically excludes any type of generalisation and understanding of new professional notions other than formal. The reason why teachers generally master new content at the level of complexes and pseudo-concepts rather than at the level of concepts is because the conceptual approach to mastering a new professional generalisation requires an activity-based means of transferring it. In most cases, the fact that traditional pedagogical professional development models do not meet these requirements usually results in the formation of professional thinking in terms of complexes along with a significant simplification of the content being mastered.

In this regard, many researchers have good grounds for emphasising the need for clearer pedagogical recommendations and specifically organised activities aimed at mastering scaffolding [25].

Thus, despite the fact that a significant number of teachers oversimplify it, the concept of scaffolding represents a real step forward in an attempt to construct a pedagogy of development [20]. In a sense, it has already fulfilled its mission and become a model of the unit of a teacher's activity, which is aimed at the development of a student's independent action by providing him or her with the necessary support adjusted to the individual level of performance, rather than at the direct transfer of information to students to make them memorise and reproduce it.

Further efforts to clarify and saturate this method of pedagogical work with the deeper scientific content originally formulated by Bruner and his colleagues – or its more accurate positioning in the system of the concepts of the cultural-historical theory – will make it possible to move from simplified versions of such teacher actions to more complex and appropriate tasks aimed at students' cognitive development. In fact, if we continue a series of metaphorical remarks on this topic, we can say that the main credit for the emergence and dissemination of the concept of scaffolding is that it turned out to be a "Trojan horse", by which means the idea of development (and, consequently, the ZPD) was able to penetrate into the "fortress of traditional education", changing the very essence and direction of pedagogical action.

Back to Vygotsky: ZPD as the development of spontaneous (everyday) concepts

As noted above, the problem of a simplified interpretation of the ZPD as adult support to pupils in solving tasks is partially related to the definitions of this concept being significantly different in Vygotsky's works. One of these is his famous statement that "what a child can do in cooperation with an adult today, he can do alone tomorrow". In this connection, it becomes important to understand how Vygotsky defined the ZPD in his later recent works that had implicitly absorbed the history of previous inquiries.

In the context of understanding the specifics of the teacher's actions aimed at building the ZPD, we believe that the most promising works of Vygotsky on the correlation between everyday and scientific concepts are, in particular, his preface to the work of Josefina Shif "On the Study of Scientific Concepts in Schoolchildren", as well as this study itself, carried out under the leadership of Vygotsky, and "Development of Everyday and Scientific Concepts at School Age", which is a transcript of a lecture given by Vygotsky at the Leningrad Pedagogical Institute in 1933.

Discussing the problem of the formation of scientific concepts in the course of school education in terms of their relationship with everyday concepts that arise before and outside school, Vygotsky comes to a number of important conclusions formulated below.

1. The development of scientific concepts cannot be based other than on the development of spontaneous concepts. Since the border between them is fluid, they flow into each other repeatedly.

2. At the moment of mastering a new word, the development of the meaning, generalisation or concept fixed in it does not terminate but, rather, it is only getting started.

3. Piaget considered the correlation between spontaneous concepts – that is, the products of the child's own thought – and of scientific concepts as antagonistic. The former are replaced by the latter in the process of developing socialisation at whose apex is learning. The teacher must consider spontaneous concepts as his or her enemies in order to suppress and destroy them. On the contrary, according to Vygotsky, it is impossible to imagine the

formation of scientific concepts outside of spontaneous concepts rather than on their basis. Scientific concepts do not flow through different channels, but developing through interaction and change. The development of scientific concepts is a process, rather than a one-time action. It is constructed on the basis of everyday (spontaneous) concepts, which become increasingly generalised and conscious in the course of organised learning. Scientific concepts cannot be memorised; rather, the child's thought must rise to this level of generalisation [4].

From this point of view, it is legitimate to argue that in the process of interaction between a teacher and a student, which is constructed as a ZPD, the teacher must create conditions for the development of spontaneous concepts of the student. In this case, the ZPD can be seen as a space (or unit of learning) in which, in the process of specifically organised student-teacher interaction (or interaction between students organised by the teacher), the development of spontaneous concepts and their transformation into scientific concepts can be ensured.

By forming a scientific concept, education paves the way for increasing the level and degree of generalisation of spontaneous concepts as a unit of the child's own thinking. At the same time, the ZPD shows a prognosis and the ability to transform spontaneous concepts in the learning process. The formation of scientific concepts becomes a means of increasing the consciousness and generalisation of spontaneous concepts as units of the child's everyday thinking.

A person thinks with reference to spontaneous concepts that are limited in the degree of generalisation and their awareness. Education, forming scientific concepts as methods of higher generalisation based on the course content, creates conditions for thereby increasing the quality of spontaneous (everyday) concepts that a child may use outside the course. Vygotsky repeatedly emphasised that the child's thinking is a unified and holistic process. By creating more perfect means and units of thinking in the process of organised learning, these means (scientific concepts and the methods of generalisation associated with them) transform all the others (everyday concepts), increasing the level of their generalisation and awareness (which, in fact, was exposed to Shif's scientific scrutiny).

In this context, the formed scientific concepts themselves become the ZPD for the development of spontaneous concepts, i.e., children's thinking. The degree of formation of scientific concepts can be a tool for assessing the further transformations of spontaneous concepts. Learning through the formation of scientific concepts and their influence on spontaneous concepts is the most important "mechanism" for the development of holistic processes of schoolchildren's thinking.

The idea that the formation of scientific concepts does not lead to the destruction or disappearance of learners' spontaneous concepts, but, rather, to their reorganisation, is related to the more general theoretical position of Vygotsky on the reorganisation of some psychological functions and the formation of new psychological systems, whereby previously independent psychological functions do not only develop themselves, being mediated by sign means, but also form new associations of these functions. For example, thinking and speech start from a

certain moment, forming verbal thinking, which leads to a qualitative change in each of them.

The above position of Vygotsky can also be applied to the problem of the content of school education. In terms of the development of this position, children study at school not only in order to embrace a certain set of knowledge, most of which will never be useful to them and much of which will become outdated by the time they finish their education. Rather, the purpose of school education consists, first of all, in the formation of scientific concepts based on the material of school subjects, ensuring the development of the child's entire thinking (including his or her everyday concepts). If the achievement of this goal can be combined with the acquisition of the knowledge that will be needed in life, then this turns out to be doubly useful. However, if the process of mastering this knowledge itself does not cause the motivation to acquire it, but, on the contrary, is accompanied by a crisis of interest, then the above "mechanism" of education simply does not work. On the other hand, if the learning does not result in scientific concepts of a high level of generalisation and arbitrariness in their use (awareness), then the mechanism of the "educational transformer of spontaneous thinking" also does not work, since the necessary means which, like a locomotive, begin to "drag" spontaneous concepts to a higher level, are not created. Learning which fails to form scientific concepts does not become the ZPD of thinking. Thus, the concept of the ZPD cannot be reduced to the question of organising a teacher's assistance to a child in the process of solving tasks. This position is an extreme oversimplification, resulting in the very essence of the concept of the ZPD being misunderstood. As consistent with Vygotsky's initial position, ZPD is a mechanism for the influence of learning on a child's development through the formation of high and arbitrary generalisations and the restructuring with their help of all other units of thinking (spontaneous concepts) formed on the basis of material outside the educational substance.

The mechanism of how learning leads development is associated with scientific concepts formed in the course of organised learning rebuilding the whole process of the child's holistic thinking (including his spontaneous concepts), making them more generalised and conscious.

The power of spontaneous concepts lies in the fact that they have personal meanings, they are emotionally coloured, being the results of generalisation of the child's own sensory or objective experience.

At the same time, most of the scientific concepts related exclusively to verbal definition do not possess such sensory experience, vivid impression and personal meaning, which creates, according to Vygotsky, the risk of formalism in the process of their assimilation only through memorisation, and not through the development of thinking as actually occurs in most cases within the framework of "traditional" education.

In their genesis, spontaneous concepts are generally products of a child's dynamic independent activity (although, as a rule, they are mediated by interaction with a collective adult), while scientific concepts are the result of the direct interaction between student and the teacher.

Most of the definitions of the ZPD relate to the character of the interaction between a teacher and a student in the course of learning – that is, the forms of this kind of cooperation and the processes associated with it: imitation, communication, mutual understanding.

At the same time, the approach to the ZPD concept proposed here following Vygotsky and Shif refers primarily to the content of interaction between a child and an adult, consisting in the cooperative creation of a scientific concept. The development is carried out as a mechanism for the influence of more generalised and conscious scientific concepts on those that spontaneous arise affecting a learner's entire cognitive holistic process.

In this case, the development of the child's thinking turns out to be associated, first of all, with the process of changing concepts (*conceptual change*) and cannot be reduced to a teacher's assistance in the process of his or her interaction with a student. "... what has been achieved in the development of a scientific concept acts as the Zone of proximal development for an everyday (concept)" [8, p. 79].

The ZPD concept, presented by Vygotsky and Shif in the context of the correlation between scientific and everyday notions, actually defines scientific concepts as the zone of proximal development of everyday concepts and the child's thinking as a whole.

However, if we examine in detail the very mechanism of the development described by Vygotsky in this connection, then it implies at least two different processes.

1. Formation of scientific concepts as a tool for generalisation and development of everyday concepts.

2. The process of generalisation and understanding of everyday concepts, which to a certain extent occurs automatically due to the integrity of the thinking process. If someone has formed scientific concepts on some subject area, then they will inevitably (and spontaneously, that is, without additional efforts) begin to rebuild other areas of thinking and everyday concepts in them.

Let's leave aside the fact that the first statement has been proven (which is a continuation of the theory of formal discipline by Johann Friedrich Herbart and the transfer of the achieved effect to other areas), both from a theoretical and an empirical point of view.

Consideration of the second part of the ZPD mechanism, namely the generalisation and understanding of everyday concepts, allows us to consider it as the main content of such an interpretation of the concept of the ZPD.

In this case, a natural question arises: is the formation of a scientific concept the only way to develop everyday ideas and is there a direct means to stimulate their development, not mediated by the formation of scientific concepts, but involving other mechanisms and processes?

In our opinion, such a method consists, for example, in a collectively-distributed form of organising joint solution of tasks, in which a given form of distribution of individual operations or elements of a task in the course of joint action forces its participants to cooperate, to argue their mode of action – and, ultimately, to awareness, reflection and development.

Another example of a psychological process of exteriorisation of spontaneous concepts, dialogue and the construction of a more complete and conscious concept

with its subsequent interiorisation is seen in the program "Philosophy for Children", which directly uses the method of Socratic debate and group discussion as a mechanism for the development of the initial concepts of students on the basis of philosophical issues.

According to Vygotsky, the role of interiorisation processes prevails (which fully corresponds to his more general methodological position on the role of the social in the formation of the psychological); however, from our point of view, no less important is the role of exteriorisation processes, without which the objectification of spontaneous concepts, i.e. their awareness and change, turns out to be impossible.

In fact, it can be assumed that the pedagogical actions of an adult in building the ZPD are largely reduced to creating conditions for the exteriorisation of spontaneous concepts, their awareness and the development of more general and more conscious concepts adequate to the object under study. The specific forms of implementation of such actions of the teacher can be very different: from the organisation of collectively distributed actions of students to jointly solve tasks to Socratic debate in the lessons of "Philosophy for Children" or in the course of specially organised dialogues based on the educational materials of academic subjects.

From the point of view of the goals of which Vygotsky speaks, it is the method of development of everyday concepts – which is actually central to the position of Vygotsky himself and associated with the formation of scientific concepts as a tool for restructuring everyday concepts and thinking in general – that seems the most problematic.

Firstly, Vygotsky himself sees significant risks in the fact that no training is able to cope with this task, but only that one which really ensures the formation of scientific concepts, an example of which can be seen in the system of developing education. However, as can be seen from the implementation of this system, there is still sufficient experimental lack of evidence of significant transfer and long-term effects outside of educational substance, including empirical data on the restructuring of everyday concepts under the influence of formed scientific concepts. In addition, from a theoretical point of view, it seems that neither Davydov's concept of learning activity nor the more richly diverse practice of developmental education, could convincingly answer a number of important theoretical questions concerning the students' spontaneous concepts and teacher's actions in this context. In comparison with the formation of dialogical concepts (criticism of the concept of learning activity from the standpoint of the scientific School of the Dialogue of Cultures), the role of scientific theoretical concepts as catalysts for changing the quality of the student's holistic thinking also remains not fully understood [1; 2; 6].

Conclusion

If the teaching is aimed only at mastering formal knowledge rather than at the development of students' spontaneous concepts, then neither the acquisition of knowledge, nor the development of students, is fulfilled.

For students who are carriers of their own spontaneous concepts, the acquisition of knowledge as the main goal of school education is impossible without transformations of these concepts. Otherwise, new formal knowledge can only be memorised, but cannot be applied in practice, while the initial spontaneous concepts of children's thinking will remain in their original form and determine the way students act. It follows that the main goal of any formally organised schooling is not any mere mastering of this knowledge, but one that is simultaneously accompanied by the transformation and development of the initial concepts of students.

The formation of a new type of students' thinking occurs, in our opinion, in a fundamentally different way from how it is described in the classical version of the theory of learning activity in the process of forming scientific concepts. In accordance with the initial position of Vygotsky, it is not scientific concepts that are formed, but their synthesis with initial concepts as a fundamentally different, two-sided process not only from top to bottom, but also from bottom to top by comprehending and generalising initial concepts along with their

rise and connection with scientific concepts. The point where they meet in the form of a "real", or actually-formed concept, will always be an individually specific centaur of a scientific-spontaneous concept, in which the balance of parts is unique and determined by individual characteristics. At the same time, the student does not form any "pure" theoretical concepts (which we can find in science but not in personal competence); they are always mixed in a certain proportion with conscious and generalised initial spontaneous concepts. The greater the level of abstraction available to the child, the less spontaneous initial concepts remained in them.

The role of the processes of exteriorisation of initial concepts, i.e. their objectification, reflection and transformation into an object of targeted changes as a result of the organisation of collectively distributed individual actions or a specifically organised educational dialogue, is a key mechanism for the development of initial concepts to the level of scientific concepts. At the same time, this activity forms the main content of a teacher's professional actions in building students' zones of proximal development.

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Зона ближайшего развития, скаффолдинг и деятельность учителя

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В статье рассматривается понятие зоны ближайшего развития (ЗБР) с точки зрения возможностей его реализации в деятельности педагогов. Дан сопоставительный анализ понятия «скаффолдинг» (scaffolding), введенного Д. Брунером; показано сходство и отличие этого понятия от ЗБР. В контексте возможной операционализации в педагогической деятельности автор рассматривает описанное Л.С. Выготским сложное взаимодействие спонтанных (житейских) понятий, сформированных до начала школьного обучения, и научных (теоретических) понятий, формируемых в ходе обучения в школе как ключевое содержание понятия ЗБР. Основная идея Л.С. Выготского о ведущей роли научных понятий в перестройке ранее сформированных спонтанных представлений и развитии всего целостного мышления ребенка позволяет сделать вывод о том, что наряду с этим возможен и непосредственный способ воздействия на спонтанные представления с помощью организации коллективно-распределенных форм учебной деятельности и метода сократического диалога. Ведущими психологическими процессами, обеспечивающими при этом развитие спонтанных представлений путем их большего обобщения и осознанности, являются процессы экстерниоризации исходных представлений, рефлексии и последующей интериоризации коллективно построенного понятия. Деятельность педагога по построению ЗБР предполагает, таким образом, организацию условий для распределения индивидуальных операций в рамках совместного учебного действия или организацию полилога, обеспечивающих эффективное функционирование указанных психологических процессов в рамках специально организованной учебной деятельности учащихся.

Ключевые слова: зона ближайшего развития, скаффолдинг, культурно-историческая психология, Выготский Л.С., педагогическая деятельность.

Для цитаты: Марголис А.А. Зона ближайшего развития, скаффолдинг и деятельность учителя // Культурно-историческая психология. 2020. Том 16. № 3. С. 15–26. DOI: <https://doi.org/10.17759/chp.2020160303>

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Получена 15.07.2020

Принята в печать 02.08.2020

Received 15.07.2020

Accepted 02.08.2020