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ВНЕ ТЕМАТИКИ

EXTRA

ТЕОРИЯ И МЕТОДОЛОГИЯ

THEORY AND METHODOLOGY

Lev S. Vygotsky (1896—1934)[1]

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This paper is written in a series of Prospect's texts on most important educators. Therefore, the focus in this paper is on Vygotsky's conception of education (learning). In case of Vygotsky, concept of the education is tightly linked to his general theory of mental development. Namely, his concept on development of higher mental function as sociogenesis of these functions imply formative role of socio-cultural factors, i.e. learning in a true sense. Consequently, Vygotsky's main ideas on education are derived from his theory of higher mental function. In more specific approach Vygotsky sees the education (learning) and the school learning as one form of development, "an artificial development" (especially an acquisition of the system of scientific concepts). Such ideas of Vygotsky have major value at present for critical analyses of real process of school learning and its improvement.

Keywords: Vygotsky's concept on higher mental functions, correlations between mental development and learning, psychological-cultural tools, education as "an artificial development".

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Лев С. Выготский (1896—1934)

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Эта статья написана в рамках серии текстов Сборника о наиболее значимых педагогах. В центре внимания этой статьи — концепция воспитания (обучения) Выготского. В случае Выготского концепция образования тесно связана с его теорией психического развития. А именно, концепцией развития высших психических функций как социогенез этих функций, подразумевающий формирующую роль социокультурных факторов, то есть обучения в подлинном смысле слова. Следовательно, основные идеи Выготского об образовании вытекают из его теории высших психических функций. В более конкретном подходе Выготский рассматривает воспитание (обучение) и школьное обучение как одну из форм развития, «искусственного развития» как усвоения систем научных понятий. Эти идеи Выготского имеют в настоящее время большое значение для критического анализа реального процесса школьного образования и его совершенствования.

Ключевые слова: Концепция высших психических функций Выготского, связь умственного развития и обучения, психолого-культурный инструментарий, образование как «искусственное развитие».

[1] Cet article est une version remaniée d'un travail paru dans: Perspectives: revue trimestrielle d'éducation comparée. Paris, UNESCO. Bureau international d'éducation, vol. XXIV, n° 3/4, 1994 (91/92). p. 793—820.

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The scientific work of Lev S. Vygotsky has had a remarkable destiny. Vygotsky, one of the greatest psychologists of the twentieth century, never received any formal training in psychology. His death at the age of 37 put an end to his research after only ten years or so, and he did not see the publication of his most important works. And yet this "Mozart of psychology" (as the philosopher S. Toulmin called him) constructed one of the most promising theories in psychology. More than fifty years after his death, now that his major works have been published, Vygotsky has become an avant-garde writer. According to one of his best exponents, "There is no doubt that, in many respects, Vygotsky is far ahead of our own time" [24, p. 120]. Such a phenomenon, so rare in the history of science, may perhaps be explained by two closely connected factors: first, the scope and originality of his scientific writings over a relatively short period offer clear proof of his genius. Second, he was working at a time of dramatic historical change, namely the October Revolution in Russia. At the heart of the psychological system constructed by Vygotsky we find an ontogenetic theory of mental development that is also in many aspects a historical theory of individual development. In other words, it is a genetic concept of a genetic phenomenon. No doubt there is an epistemological lesson to be drawn from this: it would seem that historical periods of revolutionary change sharpen the sensitivity of human thought and predispose it in favour of everything that concerns genesis, transformation, dynamic evolution and the future.

The life and work of Vygotsky

Lev S. Vygotsky was born at Orsha, a small town in Belarus, on 17 November 1896. After attending the gymnasium at Gomel, he began his university studies in law, philosophy and history at Moscow in 1912. His school and university education provided him with an excellent training in the humanities—language and linguistics, aesthetics and literature, philosophy and history. At the early age of 20 he wrote a voluminous study on *Hamlet*. He displayed a lively interest in poetry, drama, language and questions of signs and meaning, the theory of literature, the cinema, and the issues of history and philosophy, long before he began his research in psychology. It is important to note that the first book by Vygotsky, which was to point him once and for all towards psychology, was *The Psychology of Art*, published in 1925.

An interesting parallel can be drawn with Jean Piaget. They were born in the same year, and neither received any formal training in psychology; like Piaget, Vygotsky became an author of a remarkable theory of mental development. From adolescence and during his long life, Piaget was attracted by biology, and this difference in inspiration may account for the difference between two important paradigms in developmental psychology: Piaget placed the emphasis on structural aspects and on the essentially universal laws (of biological origin) of development, whereas Vygotsky stressed the contribution of culture, social interaction and the historical dimension of mental development.

After university Vygotsky returned to Gomel, where he engaged in a wide variety of intellectual activities. He taught psychology, began to take an interest in the problems of children with disabilities and continued his study of the theory of literature and the psychology of art. After his first professional successes in psychology (papers submitted to national congresses), in 1924 he settled in Moscow and began work at the Institute of Psychology. It was there when Vygotsky, surrounded by fellow workers as passionately interested as him in a thorough reconstruction of psychology, created in one prodigious decade (1924—34) his historical-cultural theory of psychological phenomena.

The essential writings and professional activities of Vygotsky, long neglected, have only recently been gradually rediscovered and reconstituted. The interested reader can now find them in the following works: Levitin [14]; Luria [17]; Mecacci [19]; Rivire [24]; Schneuwly and Bronckart [28]; Valsiner [33] and, of course, in the six-volume collection of works by Vygotsky [38].

In the course of those few years of research Vygotsky wrote some 200 works, a number of which have been lost. The principal source remains his *Collected Works*, published in Russian between 1982 and 1984; despite its title, however, this does not contain all his writings that have been preserved, and several of his previously published books and articles have not yet been reissued.

The most complete bibliography of the works of Vygotsky, together with a list of translations and studies on him, can be found in the sixth volume of the *Collected Works* and in Schneuwly and Bronckart [28]. It should be noted in passing that certain presentations of Vygotsky, particularly some of them in English, have been rather unfortunate and, in particular, have occasioned many misunderstandings. This is especially true in the case of the highly distorted presentation in English of Vygotsky's most important work *Thought and Language* [36], published in 1962. It is to be hoped that the editions of the *Collected Works* [38] currently being prepared in several languages (English, Italian, Spanish, Serbo-Croat, etc.) will help foreign scholars to gain a more accurate understanding of Vygotsky's real thinking. The bibliographical data in the original version of the *Collected Works*, together with the commentaries to be found in each volume, will, moreover, make it easier to reconstruct the origin and growth of his ideas. Such a reconstruction will, among other things, make for a sounder interpretation of his thinking, particularly those ideas that were formulated in various ways in works written at different times.

Be this as it may, there will always remain a further difficulty for readers unable to study the texts of Vygotsky in Russian: in creating an original theoretical system, Vygotsky at the same time invented a terminology that was capable of expressing the new approach. In consequence, any translation runs the risk of distorting those ideas, at least to some extent.

From the corpus of Vygotsky's ideas we shall attempt here a brief analysis of those that are relevant to education, leaving aside his thinking concerning the methodology of science, general psychology, the psychology of art, children with disabilities, etc. Our discussion will therefore concentrate on two points: the educational impacts of Vygotsky's theory of mental ontogenesis; and the analysis of his strictly and explicitly expressed educational ideas.

The interpretations offered are, needless to say, our own. Having long studied the texts of Vygotsky we shall, rather than reproduce his words, attempt to capture a deeper meaning of his ideas, to develop those ideas and to present them in language that is understandable for readers unfamiliar with his works. Then, going a step further than the mere presentation of Vygotsky's ideas about education, we shall briefly consider the application of those ideas in educational research and in everyday teaching practice.

Theory of mental development and problems of education

If we were to characterize Vygotsky's theory by employing a series of keywords or expressions, the following at least could not fail to be mentioned: human sociability, social interaction, sign and instrument, culture, history, and higher mental functions. And if we were to link these words and expressions together in a single formula, we could say that the theory of Vygotsky is a socio-historico-cultural theory of the development of higher mental functions" which is against the more frequent description of it as simply a "historical-cultural theory".

For Vygotsky, the human being is characterized by a "primary sociability". The same idea is expressed more categorically by Henri Wallon: "The individual is genetically social" [39]. During the lifetime of Vygotsky, that principle was no more than a purely theoretical hypothesis. Today, however, it is safe to say that the idea of a primary sociability, to some extent genetically determined, has virtually achieved the status of an established scientific fact. This is due to the convergence of two currents of research: on the one hand biological research on, for instance, the role of sociability in anthropogenesis or on the morpho-functional development of the infant (for example, there is increasing evidence that the areas of the brain governing social functions, such as the perception of a human face or voice, reach maturity earlier and more quickly than others); on the other hand, recent empirical research on social development in earliest childhood offers abundant proof of the existence of a primary and very early sociability (Bowlby [1]; Schaffer [27]; Zazzo [44], [45]; Thoman [31]; Lamb and Scherrod [13]; Tronick [32]; Lewis and Rosenblum [15]; Stambak et al. [29]; Zaporozec and Lisina [43]; Lisina [16]; Ignjatovic-Savic et al [9]).

Theoretical analysis led Vygotsky to advance some quite visionary ideas on the early sociability of the child and take them to their logical conclusion in constructing a theory of child development. He wrote in 1932 [38, p. 281]:

"It is through the mediation of others, through the mediation of the adult, that the child undertakes activities. Absolutely everything in the behavior of the child is merged and rooted in social relations. Thus, the child's relations with reality are from the start social relations, so that the newborn baby could be said to be in the highest degree a social being".

The sociability of children is the basis for their social interactions with the people around them. The problems raised by the psychology of social interaction are now well known; we shall therefore confine ourselves here to some brief comments on a few distinctive traits of Vygotsky's theory. Human beings, by reason of their origin and nature, can neither exist nor develop in the normal way for their species as an isolated monad: part of them is necessarily anchored in other human beings "in isolation they are not complete beings. For the development of the child, particularly in early infancy, the most important factor is asymmetrical interaction, that is, interaction with adults who are vectors of all the messages of that culture. In this type of interaction the essential role is played by signs and various semiotic systems whose initial purpose, from the genetic standpoint, is to assist communication and, later, individuation, when they begin to be used as tools for the organization and control of individual behavior.

That is the crux of Vygotsky's concept of social interaction, which plays a formative role, a constructive function, in the child's development. In other words, certain types of higher mental functions, such as deliberate attention, logical memory, verbal and conceptual thought and complex emotions, could not emerge and take form in the development process without the constructive assistance of social interaction.

This idea led Vygotsky to generalizations which heuristic value is far from exhausted, even today. We are thinking here of his famous theory concerning the transformation of interpsychic phenomena into intrapsychic phenomena. Here is one formulation of that idea [38, p. 56]:

"The most important and the most fundamental of the laws that account for genesis and towards which we are led by the study of higher mental functions could be expressed as follows: each instance of semiotic behavior by the child originated as a form of social collaboration, which is why semiotic behavior, even in the more advanced stages of development, remains a social mode of functioning. The history of the development of higher mental functions is thus seen to be the history of the process by which the tools of social behavior are transformed into instruments of individual psychological organization".

The admirable research done by Vygotsky on the basis of that idea focuses on the correlations between thought and language. Indeed, this is the central theme of his work *Thought and Language* [34]. We now know

that the child's capacity to acquire language is strongly determined by heredity.

Vygotsky's research reveals that, even so, heredity is not a sufficient condition and that a contribution from the social environment in the form of a quite specific type of teaching process is also needed. According to Vygotsky, this teaching process is simply the process of constructing something in common during activities involving the child and the adult, in social interaction. During this preverbal collaboration, the adult introduces language, which, building on preverbal communication, serves in the beginning as a tool for communication and social interaction. In his book on the subject Vygotsky describes the subtleties of the process by means of which a language, as an instrument of social relations, is transformed into an instrument of internal psychic organization for the child (apparition of private language, internal language and verbal thought).

For our purpose, which is to explore the implications for education of the theory of development, there are several important conclusions to be drawn here. In the first place we are confronted with an original answer to the question of the correlations between development and the teaching process: even for a function determined largely by heredity (such as language acquisition), the contribution of the social environment (the teaching process) is nevertheless constructive and is therefore more than a mere trigger mechanism, as it is for instinct, or a mere stimulant that simply speeds up the development of forms of behavior that would have emerged anyway. The contribution of the teaching process derives from the fact that it provides the individual with a powerful tool, namely language. During the acquisition process this tool becomes an integral part of the psychic structure of the individual (with the development of internal language). But there is something in addition: the new acquisitions (such as language), which are of a social origin, start to interact with other mental functions such as thought. This encounter engenders new functions such as verbal thought. Here we meet a Vygotsky hypothesis that has not yet been sufficiently assimilated and exploited in research, even in present-day psychology: the crucial factor in development is not the progress of each function considered separately, but the changing relationship between different functions, such as logical memory, verbal thought, and so forth. In other words, development consists in the formation of composite functions, systems of functions, systemic functions and functional systems.

Vygotsky's analysis of the correlations between development and learning in the case of language acquisition leads us to define the first model of development: in a natural process of development, learning is a means that reinforces this natural process by making available to it culture-generated tools that extend the natural possibilities of the individual and restructure his mental functions.

The role of adults as representatives of the culture in children's language acquisition process and in their assimilation of a part of the culture "the mother tongue "leads to the description of a new type of interaction besides social interaction that is of decisive importance to Vygotsky's theory, namely interaction with the products of culture. Needless to say, it is impossible to separate or to distinguish clearly between these two types of interaction, which often take the form of socio-cultural interaction.

To elucidate these ideas of Vygotsky, we shall draw upon Meyerson [20], whose central idea is as follows; "everything that is human tends to become objectified and to be projected in works" [ibid, p. 69]. The task of psychology is "to seek out the mental content in the facts of civilization described" [ibid, p. 14], or "to discern the nature of the mental operations that are involved" [ibid, p. 138].

In analyzing the role of culture in individual development, Vygotsky advanced similar ideas. Among all the acquisitions of culture, he focused his attention on the ones that would subsequently control mental processes and human behavior, that is, the various instruments and techniques (even technologies) that people assimilate and turn towards themselves in order to influence their own mental functions. There thus emerges a gigantic system of "artificial and external stimuli" by means of which people gain control over their own inner state. In Vygotsky, we encounter once again, but from a different angle, the phenomenon of interpsychism: from a psychological point of view, part of the individual is anchored in other individuals and another part in his or her works and culture, which, according to Marx, is the individual's "non-organic body". Marx's expression is highly appropriate: culture forms an integral part of the individual but it is, nevertheless, outside him. Hence the development of a person cannot be reduced solely to the changes taking place within the individual; it is also an allomorphic development capable of taking two different forms—the production of external aids as such and the creation of external tools that can be used to produce internal (psychological) changes. Thus, besides the instruments that human beings have invented throughout the course of their history and use to exercise control over objects (external reality), there exists another series of tools that, directed towards themselves, they can use to control, master and develop their own capacities.

These tools include "to mention just a few "spoken and written language (and, in McLuhan's phrase, the whole "Gutenberg galaxy"), rituals, models of behavior depicted in works of art, systems of scientific concepts, techniques that assist the memory or thinking, tools that improve motility or human perception, etc. All these cultural tools are "extensions of man" [18], that is, extensions and amplifiers of human capacities.

To a cultural anthropologist, such a statement may appear commonplace, but in psychology, where concepts are traditionally colored by subjectivity, it is very rare for such cultural factors to be taken into account. Even cultural anthropologists, however, often confine themselves to a single aspect, the objectification of human capacities in the products of culture.

For McLuhan, and even more so for Vygotsky at a much earlier date, what is important are the psychological consequences, the impact of the existence of such tools on the development of the individual, namely, the

interaction between the individual and these tools. In his analysis of those consequences, Vygotsky starts from the famous aphorism of Francis Bacon, which crops up several times in his works: *Nec manus, nisi intellectus, sibi permissus, multum valent: instrumentis et auxilibus res perficitur* [The human hand and intelligence, without the necessary tools and aids, are relatively powerless; on the other hand, their strength is reinforced by the tools and aids provided by culture].

In the first place culture creates an ever-growing stock of powerful external aids (tools, apparatus, technologies) that back up psychological processes. From knots in a handkerchief or notches on a stick for the purpose of remembering certain events, up to powerful computerized data banks or modern information technologies, the progress in "psychological technology" never ceases. Alongside the individual and natural memory or intelligence, there exists an external and artificial memory and intelligence. How effective would Europeans of today be if deprived of these technologies and left to themselves, "with naked hand and intelligence"? Could psychology produce valid conceptualizations of higher mental processes without these external aids? The fact is, the very existence of these aids changes the nature of the process, which still takes place within the individual; to be convinced of this, one has only to observe the changes in the performance of straightforward arithmetical operations by people who have become accustomed to using pocket calculators. The real tasks for research are the analyses of the restructuring of inner processes when such aids are present and of the interaction between the external and internal aspects of those processes.

In addition to external aids, however, in cultural works exist psychological tools that are capable of being internalized. These include all semiotic systems, all those skills and intellectual procedures and techniques of the media, intellectual operations and structures, and the models of intellectual activities to be found every time the acquisition of culture occurs. Vygotsky, like McLuhan, did not conclude his analysis at the superficial level of such acquisition. He wanted to grasp its hidden and deeper meanings. The direction of his exploration is expressed in McLuhan's famous maxim: "The medium is the message." In other words, it is the medium that carries the profound meanings. This approach can be made more understandable by taking the example of a tool, such as written language (both authors considered this example). An individual, the same also applies to a cultural group, for that matter "who has mastered written language is not just one who also possesses a technical skill".

Written language and book-based culture have a profound impact on the ways in which perception, memory and thought function. This is because written language contains within itself a model for the analysis of reality (treatment in discrete units, linearity and temporality in the organization of thoughts, loss of the sense of totality, etc.) and psychological techniques including, in particular, an enhanced power of memory that alters the relationship between memory and thought. Hence individuals, in gaining access to the written language, appropriate for their own use the psychological techniques available in their culture, techniques that become "internal techniques" (Vygotsky borrows this term from Claparede). Thus, a cultural tool takes root in individuals and becomes personal to them. When we consider present-day changes in technology, a question of considerable importance is raised: What are the consequences of the employment of modern intellectual (in my view, a more appropriate term than "information—) technologies, such as computers or computerized data banks, for individual cognitive processes? Vygotsky's admirable research on the appropriation of cultural tools to serve as internal techniques deals with the formation of concepts: comparative studies on experimental concepts, spontaneous concepts and scientific concepts. The outcome of this research is presented in his book, *Thought and Language* [36].

At the heart of this research lies the acquisition of systems of scientific concepts, the most important acquisition during the period when a child is a school age. Vygotsky regards the system of scientific concepts as a cultural tool that is yet another vehicle for profound messages, and its assimilation by children induces profound changes in their mode of thought.

The essential property of scientific concepts is their structure, the fact that they are organized in hierarchical systems (other possible systems would include "networks", "groups", "genealogical trees", etc.). When children interiorize a hierarchical structure they extend considerably the possibilities of their thinking process because such a structure enables them to carry out a series of intellectual operations (different types of definition, logical quantification operations, etc.). The advantages of this structure become obvious when compared with "practical" structures, for example, categories such as "furniture", "clothes" and so forth. If, for example, we attempt to give a logical definition of the term "furniture", we quickly discover the limitations of practical categories or categories based on experience which lack the formal structure of scientific concepts. The advantages all individuals draw from the assimilation of such powerful intellectual tools are obvious.

The assimilation of systems of scientific concepts is made possible by systematic education of the type received at school. Organized systematic education is essential for this, unlike oral language acquisition in which teaching has a constructive role but requires no more than the presence of adults with a command of the language to act as partners in shared activities.

This brings us to the second model of development. Vygotsky calls this "artificial development": "education may be defined as the artificial development of the child ... Education is not limited simply to influencing developmental processes; it restructures in a fundamental manner all behavioral functions" [38, p. 107].

The essential point is that education becomes development: whereas, in the first model of development, it was merely the means of reinforcing the natural process; in the second model, it is a relatively independent source of development. Using Vygotsky's theory, it is possible to identify several models of development "a point he explained himself on several occasions "by focusing on the period of development concerned, on the

nature of the cultural tools, on the extent to which functions are determined by heredity, etc.

If allowance were made for the enormous range of cultural tools and techniques a person might or might not be given the opportunity to assimilate in particular cultures or periods of history, it would be fairly easy to conceptualize intercultural or historical differences in the cognitive development of groups and of individuals. With such a concept of the development of human intelligence it seems paradoxal to speak of "culture-free tests of intelligence" (which Bruner calls "intelligence-free tests-) or to maintain that the only possible scientific definition of intelligence is one that reduces it to indicators such as reaction time, evoked potential, etc., as Eysenck [6] does.

His analysis of this second model of development, the model of "artificial development", exemplified in the process by which systems of concepts are assimilated, leads Vygotsky to his discovery of the metacognitive dimension of development. The fact is that the assimilation of knowledge systems based on such a degree of generalization, the interdependence of concepts within a network which smooths the transition from one concept to another and simplifies the execution of intellectual operations, and the existence of external models (in books or demonstrated by the teacher) for the conduct of these operations, all facilitate the individual's realization (in Russian, *osoznanie*) and command (*ovladenie*) of their own cognitive processes.

This process of deliberate self-regulation can be helped by the type of learning process (verbal learning, explanation of intellectual methods of approach, description of the concept-building process, concept-building in common, monitoring of the learning process by the adult expert, etc.).

In these conditions, the individual boy or girl would be able to achieve a fairly clear understanding of his or her own knowledge-acquisition processes and to exert deliberate control "the very essence of metacognitive processes "over them. Here it should be made clear that the writings of Vygotsky constitute the most important theoretical and historical source for the conceptualization and empirical study of metacognitive processes. Vygotsky's scientific achievement in this field is evident: instead of regarding metacognitive process as no more than practical techniques for self-mastery (like mnemonics, for example) or as an isolated question (like most questions of metamemory), Vygotsky offers a theoretical framework. For him, the problems of metacognitive processes are integrated into a general theory concerning the development of higher mental functions. In his theory, these processes are seen as a stage that is necessary, in certain specified conditions, for development. In return, they play an important role in the restructuring of cognition in general. This role provides the clearest illustration of Vygotsky's concept of development as the process whereby the relationships between particular mental functions are transformed. In this context, for example, even the term "metamemory" [7] is inappropriate, since Vygotsky is not concerned here with the working of memorization techniques in the activity of memorization, but with the working in such activities of thought processes that have become conscious and deliberate. In other words, he is speaking about a new relationship between two distinct functions.

Even today, Vygotsky's theory is the only one that offers, at least in principle, the possibility of conceptualizing scientifically metacognitive processes, the only one that makes it possible to link up this dimension of cognitive development with cognitive development in general and to understand the source of a person's capacity to control his or her own inner processes (as a result of the transition, outlined by Vygotsky and mentioned above, from external inter-individual control to personal intrapsychic control).

We shall conclude this part of our study by sketching in some possible ways in which Vygotsky's theory of mental development could be used in educational research and practice. In our view the most important ones are:

First, no other psychological theory of development attaches so much importance to education. In Vygotsky's theory, education contains nothing that is external to development. As J. P.Bronckart rightly states (in [28] author's emphasis): "*The school becomes the natural arena of psychology* because it is the scene of learning processes and of the genesis of psychic functions". That is why the theory could be effectively employed to improve our understanding of education-related phenomena "especially their role in development "to design educational research projects and to test practical applications.

Second, as a direct or indirect consequence of Vygotsky's theory, a whole series of new empirical research problems of capital importance for education have been incorporated into present-day psychology.

Research on the sociability of the infant (see sources already mentioned), a rapidly expanding area of research, has improved our understanding of early childhood, and there have already been some practical applications in the education of young children.

The correlation between social interactions and cognitive development is one of Vygotsky's typical themes and is very much in fashion in present-day psychology; it stands at the interface between social psychology and cognitive psychology and has obvious practical applications in education (for example, [22], [4], [3], [26], [40] [42]).

Current research on semiotic mediation, on the role of semiotic systems in mental development, and on the development of language are manifestly strongly influenced by the ideas of Vygotsky ([10], [41] and others).

Third, Vygotsky's theory is historically and scientifically the only significant source in present-day psychology of research on metacognitive processes. It would be impossible to overestimate the importance of these processes in education and development. Even though highly productive theoretical and empirical research could be conceived within the framework of Vygotsky's theory, the absence of such research is the sole explanation for the continued neglect of these processes in education. They are now both on the agenda of psychology and pedagogy.

Fourth, it would be easy to develop an analytical grid and set of instruments for research and diagnosis on the

basis of Vygotsky's concept of "artificial development", namely, the sociocultural development of cognitive functions. To start with, it would be enough simply to build up a list of the external aids, the tools and the "internal techniques" at the disposal of individuals and social and cultural groups in order to determine parameters in the light of which comparisons could be made. It is obvious that such instruments, developed within a theoretical framework of this nature, would eliminate the dangers of racist and chauvinistic interpretations.

Fifth, besides the two models already mentioned in this article, a whole series of learning patterns have been conceptualized on the basis of Vygotsky's or similar ideas. These include cooperative learning, guided learning, learning based on the socio-cognitive conflict, knowledge construction in common, etc. [2]. [3], [4], [22], [26], [29]).

Finally, the recent emergence of modern audio-visual media and information technologies, their applications in teaching and their short- and long-term place in the lives of children, raise new and serious problems. What instrument could be more relevant and more useful for research into the impact of these new cultural tools than a theory like Vygotsky's, which sets their role in psychological, historical and ontogenetic development precisely at the center of its concerns? This theory offers an ideal conceptual framework for such research, but there remains the hard task of putting it on an operational footing and conducting empirical research.

When we attempt a critical appraisal of Vygotsky's ideas, the first observation that springs to mind is that his theory has remained in many respects a mere sketch, insufficiently developed and operational. In many cases, for instance, his theoretical arguments are not illustrated or supplemented by appropriate methodology. These omissions cannot be blamed on Vygotsky, whose ideas were often simply restated rather than built upon by his disciples. Nor can Vygotsky be blamed for the fact that present-day psychology has wasted effort and resources in conducting research based on much less fruitful paradigms than his.

There has been frequent criticism of the distinction drawn by Vygotsky between two channels of mental development (which he actually regards as intertwined), that is to say, natural (spontaneous and biological) development and artificial (social and cultural) development. We are in agreement with Liders on the necessity of retaining this scientifically productive contrast in preference to the facile claim that all human development is cultural.

In our opinion the true starting-point for any critical appraisal of Vygotsky's theory should be the absence of criticism of social and cultural institutions (and "tools"). Vygotsky, fascinated by the constructive contributions made by society and culture, never really managed to work out a critical analysis, in the modern sense, of those institutions.

The fact is that the perturbation of social relations (in the social group, the immediate environment or the family) may be capable of proving seriously pathogenetic, precisely through the action of the mechanisms discovered by Vygotsky. Similarly, the cultural "tools", again through the action of Vygotskian mechanisms, cannot be agents solely of mind formation; they also contribute to general development "for example, the formation of narrow-minded, dogmatic or sterile attitudes "precisely because the individuals concerned have experienced interactions with the cultural carriers of such profound tools and messages.

The critical analysis of institutions, including schools, and of social and cultural agents could clarify the conditions in which socio-cultural "tools and instruments" become the deformative factors of development.

Vygotsky's ideas on teaching

In the first part of this profile we looked into the consequences for education of Vygotsky's theory of development. We shall now briefly review his more explicit ideas on education. It must be said, however, that we regard the analysis conducted in the previous section to be of greater importance for this subject.

Vygotsky was himself a very active and, it is said, very gifted teacher. As a member of various bodies in charge of national education, he had a hand in dealing with the practical problems facing the Soviet education system at the time, including the transition from a holistic to a discipline-centred approach in primary schools, and throughout his life he was interested in the education of children with disabilities.

We shall make a few comments here on the educational problems raised by the relationship between development and the learning process, on the "proximal zone of development" concept and on specific aspects of formal education.

Vygotsky regarded the question of the relationship between development and the learning process as primarily a theoretical one. Since his theory regards education as being closely connected with development, however, and development as taking place in the actual socio-cultural environment, his analyses are focused directly on education of the type provided in schools.

We have already seen that one of his models of development (Model II—artificial development) depends, in fact, upon formal education, the core of which is the acquisition of systems of scientific concepts.

For Vygotsky, therefore, education cannot be reduced to the acquisition of a body of information; it is one of the sources of development and is even defined as the artificial development of the child. Hence, the essence of education is to ensure the child's development by the provision of tools, internal techniques and intellectual operations. On many occasions Vygotsky even speaks of the acquisition (learning) of different types of activity. If we applied his approach to botanical classification, for example, we could say that for Vygotsky the essential thing is not a knowledge of taxonomic categories but a mastery of the classification procedure (definition and application of taxonomic criteria, the classification of ambiguous or borderline cases, determination of new members of a class and, most important of all, learn-

ing to execute the logical operations that interlink various classes, etc.).

All this goes to show that Vygotsky attached the greatest importance to the content of educational curricula but placed the emphasis on the structural and instrumental aspects of that content, the significance of which was mentioned in our analysis of the implications of McLuhan's phrase "the medium is the message". In this connection, it must be said that Vygotsky did not take these fruitful ideas far enough. In this approach it is quite possible to regard the school itself as a "message", that is, a fundamental factor of education because, as an institution and quite apart from the content of its teaching, it implies a certain structuring of time and space and is based on a system of social relations (between pupils and teachers, between the pupils themselves, between the school and its surroundings, and so on). Indeed, the impact of formal education depends to a considerable extent on these aspects of the "educational medium".

Secondly, we have already seen that Vygotsky did not take his criticism of formal education very far despite its pertinence to his system of thought: the school does not always teach systems of knowledge but in many cases overburdens its pupils with isolated and meaningless facts; school curricula do not incorporate tools and intellectual techniques; all too often, schools do not provide a setting for social interactions conducive to knowledge construction, etc. Lastly, Elkonin [5] rightly reproaches Vygotsky for not paying enough attention to teaching methods.

Vygotsky's concept of "the proximal zone of development" has first of all theoretical impacts. In the sociocultural concept of development children cannot be regarded as cut off from their social and cultural environment like young Robinson Crusoes. Their ties with other people form part of their very nature. It is thus impossible to analyze their development, aptitudes or education without taking social ties into consideration. The concept of the proximal zone of development illustrates this view precisely. This zone is defined as the difference (expressed in units of time) between the performance of the same child working with and assisted by an adult. For example, two children pass tests for 8-year-olds on a psychometric scale; with standardized assistance, the first attains the 9-year level and second the 12-year level; in this case the proximal zone is one year for the first child and four years for the second. In this concept of the proximal zone, the view of the child as a social being engenders a methodological approach with far-reaching implications, since the child's development is regarded as a dynamic and dialectical process. Applied to pedagogy, the concept of the proximal zone offers a way out of the eternal dilemma of education: should we wait until children have attained a particular level of development before beginning formal education or should we expose them to a certain education so that they may attain a particular level of development?

Following the dialectic of the relationship between the learning and development processes examined earlier, Vygotsky adds that development is more productive if children are exposed to new learning precisely in their proximal zone of development. In this zone and with adult assistance children would be able to assimilate more easily what they would be incapable of assimilating if left to themselves.

The actual forms taken by adult assistance in the proximal zone vary enormously: the demonstration of methods to be imitated, examples, maieutic questions, monitoring by the adult and, most important of all, shared activities (*sovmestnaja deatel'nost*) as a constructive factor of development.

The heuristic value of the proximal zone concept has not been sufficiently exploited. The nature of the concept translates into operational terms the theoretical concept of the child as a social being. But its applications need to be taken further and, in fact, a new approach to the theoretical and practical construction of diagnostic tools based on that concept is currently being developed. It involves studying the dynamics of the development process (rather than present performance) and the capacities of normal or handicapped children, in order to draw maximum benefit from the assistance and learning opportunities offered.

A second direction that could be explored in the application of this concept is education in the family and at school. There is evidence that many parents spontaneously direct their teaching efforts precisely towards the proximal zone [9]. Bearing in mind Vygotsky's oft-repeated view that the education of a child should ideally be aimed at the proximal zone in which that child experiences his/her encounters with the culture, assisted by an adult acting initially as a partner in shared constructions and later as the organizer of the learning process, formal education could be regarded as a powerful support for natural development (Model I) or as a relatively independent source (Model II). The references to formal education that we find in Vygotsky should be taken not as descriptions of actual educational situations, however, but rather as an outline for the renewal of education. Vygotsky's theory, formulated over fifty years ago, has such heuristic potential that it could very well become one of the instruments for this renewal of present-day formal education.

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