

Language diversity: Appendix One

The interaction between learning and development

L Vygotsky, 1978

Adapted from **Gultig** (2010). **Learners and learning**, Saide. 2010. Reading 4 found at https://www.oerafrica.org/sites/default/files/L%20%26%20L%20reader_section%20one-reading_4.pdf

Editor's notes

This edited extract is from L. S. Vygotsky, 'Interaction between learning and development' (Chapter 6) in *Mind in Society: The Development of Higher Psychological Processes* (London: Harvard University Press, 1978).

Vygotsky is a Russian psychologist who worked during the early part of the twentieth century. As such, he was a contemporary of Piaget's and you will notice that he refers to Piaget in this article. You will also notice that Vygotsky begins his argument by considering the problem Piaget considered; namely the relationship between development and learning.

Like Piaget, Vygotsky rejects both maturation and 'the mastery of conditioned reflexes' (the impact of the environment) as sufficient to explain learning. For him, learning can only be understood as the outcome of:

...internal developmental processes that are able to operate only when the child is interacting with people in his environment and in co-operation with his peers' (Vygotsky, 1978).

In other words, Vygotsky argues that the mediation of someone more knowledgeable is vital in learning. In this, he suggests that Piaget's explanation of learning is incomplete. He raises the idea of the zone of proximal development which allows us to see how working with a learner's potential – through good teaching or mediation – allows us to accelerate and deepen learning.

You might find it helpful to read *Appendix Three: What can we learn from Piaget?* before you read this. But you should definitely read Appendix Three at some point. It is the reading for Activity 4 in the story. You can also find it at

https://www.oerafrica.org/system/files/8806/learners-and-learningsection-2_0.pdf?file=1&type=node&id=8806&force=1

What is the relationship between learning and development?

The problems encountered in the psychological analysis of teaching cannot be correctly resolved or even formulated without addressing the relation between learning and development in school-age children.

Yet it is the most unclear of all the basic issues on which the application of child development theories to educational processes depends. Needless to say, the lack of theoretical clarity does not mean that the issue is removed altogether from current research efforts into learning; not one study can avoid this central theoretical issue.

But the relation between learning and development remains methodologically unclear because concrete research studies have embodied theoretically vague, critically unevaluated, and sometimes internally contradictory postulates, premises, and peculiar solutions to the problem of this fundamental relationship; and these, of course, result in a variety of errors.

Essentially, all current conceptions of the relation between development and learning in children can be reduced to three major theoretical positions.

Position 1: Child development and learning are independent of each other

The first centres on the assumption that processes of child development are independent of learning.

Learning is considered a purely external process that is not actively involved in development. It merely utilises the achievements of development rather than providing an impetus for modifying its course. This position assumes that processes such as deduction and understanding, evolution of notions about the world, interpretation of physical causality, and mastery of logical forms of thought and abstract logic all occur by themselves, without any influence from school learning.

An example of such a theory is Piaget's extremely complex and interesting theoretical principles, which also shape the experimental methodology he employs. The questions Piaget uses in the course of his clinical conversations with children clearly illustrate his approach. When a five-year-old is asked, 'Why doesn't the sun fall?' it is assumed that the child has neither a ready answer for such a question nor the general capabilities for generating one. The point of asking questions that are so far beyond the reach of the child's intellectual skills is to eliminate the influence of previous experience and knowledge. The experimenter seeks to obtain the tendencies of children's thinking in 'pure form, entirely independent of learning'.

Because this approach is based on the premise that learning trails behind development – that development always outruns learning – it precludes the notion that learning may play a role in the course of the development or maturation of those functions activated in the course of learning. Development or maturation is viewed as a precondition of learning but never the result of it.

To summarise this position: Learning forms a superstructure over development, leaving the latter essentially unaltered.

Position 2: Learning is the same thing as child development

The second major theoretical position is that learning is development. This position includes a group of theories that are quite diverse in origin. One such theory is based on the concept of reflex, an essentially old notion that has been extensively revived recently. Whether reading, writing, or arithmetic is being considered, development is viewed as the mastery of conditioned reflexes; that is, the process of learning is completely and inseparably blended with the process of development.

Position 3: A combination of positions 1 and 2

The third theoretical position on the relation between learning and development attempts to overcome the extremes of the other two by simply combining them.

Three aspects of this position are new:

- First, as we already noted, it is the combination of two seemingly opposite viewpoints, each of which has been encountered separately in the history of science. The very fact that these two viewpoints can be combined into one theory indicates that they are not opposing and mutually exclusive but have something essential in common.
- Also new is the idea that the two processes that make up development are mutually dependent and interactive. Of course, the nature of the interaction is limited solely to very general remarks regarding the relation between these two processes. It is clear that the process of maturation prepares and makes possible a specific process of learning. The learning process then stimulates and pushes forward the maturation process.
- The third and most important new aspect of this theory is the expanded role it ascribes to learning in child development. This emphasis leads us directly to an old pedagogical problem, that of formal discipline and the problem of transfer.

Editor's notes

Vygotsky is, in fact, setting up the beginnings of his own approach. Although he doesn't accept position 3 (as you will notice below), we think that he does build his theory on these three points. What do you think?

The Zone of Proximal Development (ZPD): Understanding the relationship in a new way

Although we reject all three theoretical positions discussed above, analysing them leads us to a more adequate view of the relation between learning and development. The question to be framed in arriving at a solution to this problem is complex. It consists of two separate issues:

- the general relation between learning and development;
- the specific features of this relationship when children reach school age.

That children's learning begins long before they attend school is the starting point of this discussion. Any learning a child encounters in school always has a previous history. For example, children begin to study arithmetic in school, but long beforehand they have had some experience with quantity; they have had to deal with operations of division, addition, subtraction, and determination of size.

Consequently, children have their own pre-school arithmetic.

It goes without saying that learning as it occurs in the pre-school years differs markedly from school learning, which is concerned with the assimilation of the fundamentals of scientific knowledge. But even when, in the period of her first questions, a child assimilates the names of objects in her environment, she is learning. Indeed, can it be doubted that children learn speech from adults? Or that,

through asking questions and giving answers, children acquire a variety of information? Or that, through imitating adults and through being instructed about how to act, children develop an entire repository of skills?

Learning and development are interrelated from the child's very first day of life.

Matching learning with a child's developmental level

A well-known and empirically-established fact is that learning should be matched in some manner with the child's developmental level. For example, it has been established that the teaching of reading, writing, and arithmetic should be initiated at a specific age level. Only recently, however, has attention been directed to the fact that we cannot limit ourselves merely to determining developmental levels if we wish to discover the actual relations of the developmental process to learning capabilities.

We must determine at least two developmental levels.

Actual developmental level

The first level can be called the actual developmental level, that is, the level of development of a child's mental functions that has been established as a result of certain already-completed developmental cycles.

When we determine a child's mental age by using tests, we are almost always dealing with the actual developmental level. In studies of children's mental development, it is generally assumed that only those things that children can do on their own are indicative of mental abilities. We give children a battery of tests or a variety of tasks of varying degrees of difficulty, and we judge the extent of their mental development on the basis of how they solve them and at what level of difficulty.

On the other hand, if we offer leading questions or show how the problem can be solved and the child then solves it, or if the teacher initiates the solution and the child completes it or solves it in collaboration with other children, the solution is not regarded as indicative of his mental development.

In other words, if the child missed an independent solution to the problem, the solution wasn't regarded as indicative of his mental development. This 'truth' was familiar and reinforced by common sense. Over a decade even the profoundest thinkers never questioned the assumption; they never entertained the notion that what children can do with the assistance of others might be in some sense even more indicative of their mental development than what they can do alone.

Let us take a simple example. Suppose I investigate two children upon entrance into school, both of whom are ten years old chronologically and eight years old in terms of mental development. Can I say that they are the same age mentally? Of course. What does this mean? It means that they can independently deal with tasks up to the degree of difficulty that has been standardised for the eight-year-old level.

If I stop at this point, people would imagine that the subsequent course of mental development and of school learning for these children will be the same, because it depends on their intellect. Of course, there may be other factors, for example, if one

child was sick for half a year while the other was never absent from school; but generally speaking, the fate of these children should be the same.

Potential developmental level

But now imagine that I do not terminate my study at this point, but only begin it. These children seem to be capable of handling problems up to an eight-year-old's level, but not beyond that.

Suppose that I show them various ways of dealing with the problem. Different experimenters might employ different modes of demonstration in different cases: some might run through an entire demonstration and ask the children to repeat it, others might initiate the solution and ask the child to finish it, or offer leading questions.

In short, in some way or another I propose that the children solve the problem with my assistance.

Under these circumstances it turns out that the first child can deal with problems up to a twelve-year-old's level, the second up to a nine-year-old's. Now, are these children mentally the same?

When it was first shown that the capability of children with equal levels of mental development to learn under a teacher's guidance varied to the interaction between learning and development a high degree, it became apparent that those children were not mentally the same age and that the subsequent course of their learning would obviously be different.

This difference between twelve and eight, or between nine and eight, is what we call the zone of proximal development. We describe it as:

The distance between the actual developmental level 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.

If we naively ask what the actual developmental level is, or, to put it more simply, what more independent problem-solving reveals, the most common answer would be that a child's actual developmental level defines functions that have already matured, that is, the end products of development. If a child can do such-and-such independently, it means that the functions for such-and-such have matured in her.

What, then, is defined by the zone of proximal development, as determined through problems that children cannot solve independently but only with assistance? The zone of proximal development defines those functions that have not yet matured but are in the process of maturation, functions that will mature tomorrow but are currently in an embryonic state. These functions could be termed the 'buds' or 'flowers' of development rather than the 'fruits' of development.

The actual developmental level characterises mental development retrospectively, while the zone of proximal development characterises mental development prospectively.

How does the ZPD help us teach?

The zone of proximal development furnishes psychologists and educators with a tool through which the internal course of development can be understood.

By using this method we can take account of not only the cycles and maturation processes that have already been completed but also those processes that are currently in a state of formation, that are just beginning to mature and develop. Thus, the zone of proximal development permits us to delineate the child's immediate future and his dynamic developmental state, allowing not only for what already has been achieved developmentally but also for what is in the course of maturing.

The two children in our example displayed the same mental age from the viewpoint of developmental cycles already completed, but the developmental dynamics of the two were entirely different. The state of a child's mental development can be determined only by clarifying its two levels: the actual developmental level and the zone of proximal development.

I will discuss one study of pre-school children to demonstrate that what is in the zone of proximal development today will be the actual developmental level tomorrow. In other words, what a child can do with assistance today she will be able to do by herself tomorrow.

An example of the ZPD

The American researcher Dorothea McCarthy showed that among children between the ages of three and five there are two groups of functions:

- those the children already possess;
- those they can perform under guidance in groups and in collaboration with one another but which they have not mastered independently.

McCarthy's study demonstrated that this second group of functions is at the actual developmental level of five- to seven-year-olds (rather than three- to five-year-olds). What her subjects could do only under guidance, in collaboration, and in groups at the age of three to five years, they could do independently when they reached the age of five to seven years.

Thus, if we were to determine only mental age (only functions that have matured) we would have but a summary of completed development. But if we determine the maturing functions, we can predict what will happen to these children when they reach the ages of five to seven years old, provided the same developmental conditions are maintained.

The zone of proximal development can become a powerful concept in developmental research, one that can markedly enhance the effectiveness and utility of the application of diagnostics of mental development to educational problems.

Rethinking the role of imitation in learning

A full understanding of the concept of the zone of proximal development must result in re-evaluation of the role of imitation in learning.

An unshakeable tenet of classical psychology is that only the independent activity of children, not their imitative activity, indicates their level of mental development. This view is expressed in all current testing systems. In evaluating mental development, consideration is given to only those solutions to test problems which the child reaches without the assistance of others, without demonstrations, and without leading questions.

Imitation and learning are thought of as purely mechanical processes.

But recently psychologists have shown that a person can imitate only that which is within her developmental level. For example, if a child is having difficulty with a problem in arithmetic and the teacher solves it on the board, the child may grasp the solution in an instant. But if the teacher were to solve a problem in higher mathematics, the child would not be able to understand the solution no matter how many times she imitated it.

Animal psychologists have dealt with this question of imitation quite well. Primates can use imitation to solve only those problems that are of the same degree of difficulty as those they can solve alone. However, primates cannot be taught (in the human sense of the word) through imitation, nor can their intellect be developed, because they have no zone of proximal development. A primate can learn a great deal through training by using its mechanical and mental skills, but it cannot be made more intelligent. In other words, it cannot be taught to solve a variety of more advanced problems independently. For this reason, animals are incapable of learning in the human sense of the term; human learning presupposes a specific social nature and a process by which children grow into the intellectual life of those around them.

Children can imitate a variety of actions that go well beyond the limits of their own capabilities. Using imitation, children are capable of doing much more in collective activity or under the guidance of adults. This fact, which seems to be of little significance in itself, is of fundamental importance in that it demands a radical alteration of the entire doctrine concerning the relation between learning and development in children.

The importance of language in learning

The acquisition of language can provide a paradigm for the entire problem of the relation between learning and development.

Language arises initially as a means of communication between the child and the people in his environment. Only subsequently, upon conversion to internal speech, does it come to organise the child's thought. In other words, it becomes an internal mental function.

Piaget and others have shown that reasoning occurs in a children's group as an argument intended to prove one's own point of view before it occurs as an internal activity whose distinctive feature is that the child begins to perceive and check the basis of his thoughts. Such observations prompted Piaget to conclude that communication produces the need for checking and confirming thoughts, a process that is characteristic of adult thought.

In the same way that internal speech and reflective thought arise from the interactions between the child and people in her environment, these interactions provide the source of development of a child's voluntary behaviour. Piaget has shown that co-operation provides the basis for the development of a child's moral judgement. Earlier research established that a child first becomes able to subordinate her behaviour to rules in group play and only later does voluntary self-regulation of behaviour arise as an internal function.

These individual examples illustrate a general developmental law for the higher mental functions that we feel can be applied in its entirety to children's learning processes.

We propose that an essential feature of learning is that it creates the zone of proximal development.

What does this mean? Basically, that learning must awaken a variety of internal developmental processes that are able to operate only when the child is interacting with people in his environment and in co-operation with his peers. Once these processes are internalised, they become part of the child's independent developmental achievement.

From this point of view, learning is not development. However, properly organised learning results in mental development and sets in motion a variety of developmental processes that would be impossible apart from learning. Thus, learning is a necessary and universal aspect of the process of developing culturally organised, specifically human, psychological functions.

In conclusion

To summarise, the most essential feature of our hypothesis is the notion that developmental processes do not coincide with learning processes. Rather, the developmental process lags behind the learning process. This sequence, then, results in zones of proximal development.

Our analysis alters the traditional view that at the moment a child assimilates the meaning of a word, or masters an operation such as addition or written language, her developmental processes are basically completed. In fact, they have only just begun.

The major consequence of analysing the educational process in this manner is to show that the initial mastery of, for example, the four arithmetic operations provides the basis for the subsequent development of a variety of highly complex internal processes in children's thinking.

Our hypothesis establishes the unity but not the identity of learning processes and internal developmental processes. It presupposes that the one is converted into the other. Therefore, it becomes an important concern of psychological research to show how external knowledge and abilities in children become internalised.

Any investigation explores some sphere of reality. An aim of the psychological analysis of development is to describe the internal relations of the intellectual processes awakened by school learning.

In this respect, such analysis will be directed inward and is analogous to the use of x-rays. If successful, it should reveal to the teacher how developmental processes stimulated by the course of school learning are carried through inside the head of each individual child. The revelation of this internal, subterranean developmental network of school subjects is a task of primary importance for psychological and educational analysis.

A second essential feature of our hypothesis is the notion that, although learning is directly related to the course of child development, the two are never accomplished in equal measure or in parallel. Development in children never follows school learning the way a shadow follows the object that casts it. In actuality, there are highly complex dynamic relations between developmental and learning processes that cannot be encompassed by an unchanging hypothetical formulation.

Each school subject has its own specific relation to the course of child development, a relation that varies as the child goes from one stage to another. This leads us directly to a re-examination of the problem of formal discipline, that is, to the significance of each particular subject from the viewpoint of overall mental development.

Clearly, the problem cannot be solved by using any one formula; extensive and highly diverse concrete research based on the concept of the zone of proximal development is necessary to resolve the issue.