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## “Key to Learning”. A neo-Vygotskian program for children aged 3 to 7

## “Key to Learning”. Un programa educativo neo-Vygotskiano para niños de 3 a 7

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*Abstract: The aim of the present article is to provide an overview of the educational program “Key to Learning”, a curricular proposal which was developed from the work and ideas of several contemporary Russian authors sharing a Vygotskian orientation. The program, addressed at children between 3 and 7 years of age, consists of different activities divided in 12 curricular units. The main objective of the program is to improve the cognitive, communicative and directive learning skills, meaning learning skills as the capacities which determine the velocity and flexibility needed to acquire new knowledge and skills. For this purpose are created the 12 units composing the program: Sensory Mathematics, Logic, Mathematics, Story Grammar, Developmental Games, Artographics, Visual-Spatial, Creative Modeling, Construction, Exploration, Expressive Movement and You-Me-World. After presenting the psychopedagogical foundations of the program, the different curricular units will be illustrated together with some activities which exemplify the application procedure.*

*Key words: Vygotsky, zone of proximal development, educational program.*

*Resumen: El objetivo del artículo es presentar una visión general del programa educativo "Key to Learning", una propuesta curricular desarrollada por distintos autores rusos contemporáneos de orientación vygotskiana. El programa, dirigido a niños y niñas de 3 a 7 años de edad, consiste en distintas actividades divididas en 12 unidades curriculares. El objetivo principal del programa es mejorar las habilidades de aprendizaje cognitivas, comunicativas y directivas, entendiendo por habilidades de aprendizaje los recursos o capacidades que determinan la velocidad y flexibilidad necesaria para adquirir nuevos conocimientos y habilidades. Para este propósito se proponen 12 unidades: Matemáticas Sensoriales, Lógica, Matemáticas, Gramática de la Historia, Juegos de Desarrollo, Artegráfico, Viso-Espacial, Modelaje Creativo, Construcción, Exploración, Movimiento Expresivo y Yo-Mundo. Después de*

*presentar las bases psicopedagógicas del programa, se ilustran las distintas unidades curriculares con actividades que ejemplifican su modo de aplicación.*

Palabras Clave: *Vygotsky, zona de desarrollo próximo, programa educativo.*

### Building zones of proximal development. The objective of the education under a Vygotskian approach

One of the most recognized Vygotskian concepts in the postVygotskian literature is undoubtedly the “Zone of Proximal Development”, from now on, ZPD (Álvarez, 1997; Daniels, Cole & Wertsch, 2007; Moll, 1990; Newman, Griffin & Cole, 1989; Rogoff & Wertsch, 1984). The ZPD is the distance between the actual developmental level, or the capacity of solving problems autonomously, and the level of potential development, which is determined by the capacity of solving problems under the guidance or collaboration of an adult or a more capable peer (Vygotski, 1978).

Originally, the ZPD concept had two aims. First, it was intended to reconceptualize the existing relationships between development, or evolutive change, and learning, or educational change. Vygotsky's thesis can be summarized by the expression “the only good learning is that which is in advance of development” (Vygotski, 1978, p. 89). Such a proposal implied a reversal in the Piagetian approach to the connections between development and learning, who subordinated the education to the cognitive, intellectual change (Esteban, Sidera, Serrano, 2008). On the other hand, the notion of ZPD was meant to provide new elements to the evaluation in its traditional sense; this is, measuring the students' learnings in terms of the zone of actual development. Thus, traditional evaluation focus on what students can do alone. However, according to Vygotsky (1979), the education does not consist on what people are capable of doing without the help of tools or other people. On the other hand, it is the result of a scaffolding process (Wood, Bruner y Ross, 1976) situated in the Zone of Proximal Development, where the interactions and relations established between an expert, an apprentice and the content (the artifacts or the learning material).

From this perspective, learning and teaching involve creating a shared understanding between an expert and a learner, where the former helps the latter to use a particular artifact. For example, a driving instructor helps his students to internalize the rudiments involved in driving a vehicle. In other words, educating entails creating ZPDs that make possible the acquisition of psychological and cultural instruments such as literacy, mathematical notation, music or e-literacy.

Therefore, to educate involves going beyond the capacity of a student or a learner to do things autonomously, without the help of anybody or anything. To educate is to be in the Zone of Potential Development of the learner. In this sense, the educational program “Key to Learning”, henceforth KTL, serves as a collection of activities with the pedagogical goal to create and operate in the Zone of Potential Development so as to facilitate different kinds of learnings.

"Key to Learning". A proposal to develop learning skills

In order to increase our physical and psychological possibilities, humankind has invented instruments that permit to extend our mental abilities (our cognition, communication and self-regulation). The children need to attain these psychological technologies because they allow them to think logically, to perceive the world through concepts and to regulate their own and the others' behavior. That is, by participating in a community the children acquire the psychological tools (symbols, diagrams, models, graphs, maps, etc...) that change dramatically their learning processes by means of the organization and the regulation of their own activities

Once a child learns to use these psychological artifacts that have a sociocultural background, he becomes capable of doing new and varied actions. In short, children acquire new skills. The learning skills are "mental habits" that people need to carry out successfully various cultural activities (Dolya, 2010). To put it another way, the use of concepts, visual signs, symbols, models, texts, maps, formulas or words, allows the children to perform sociocultural actions such as maintaining a conversation, crossing a traffic light, taking part in a sporting event or going to the supermarket. Therefore, the acquisition and development of these learning skills (that determine the speed and flexibility with which the new knowledge and skills are acquired and applied) modifies the learners' personality. They start planning and organizing their activities, expressing their viewpoints and that of others, providing different solutions to problems or interacting with others in a friendly way.

Dyachenko and Veraksa (1990; 1994) argue that in order to succeed in the school learning activities, or to show specific linguistic, mathematical, musical, physical, intrapersonal, interpersonal or visual-art skills, the children need to develop general self-regulation abilities (to plan and to execute activities), communication skills (to express and to understand others) and cognitive abilities (to identify, to model and to change relationships). It must be considered though that the cognitive abilities can be divided in the intellectual abilities, which are used to solve problems in a conventional or standard way, and the creative abilities, which are useful to find alternative solutions to the problems, either by transforming ideas (dialectically) or through the representation of objects (symbolically). Thus, the general learning skills are a prerequisite for acquiring the specific learning skills (linguistic, mathematical, artistic, etc...) (See Figure 1).

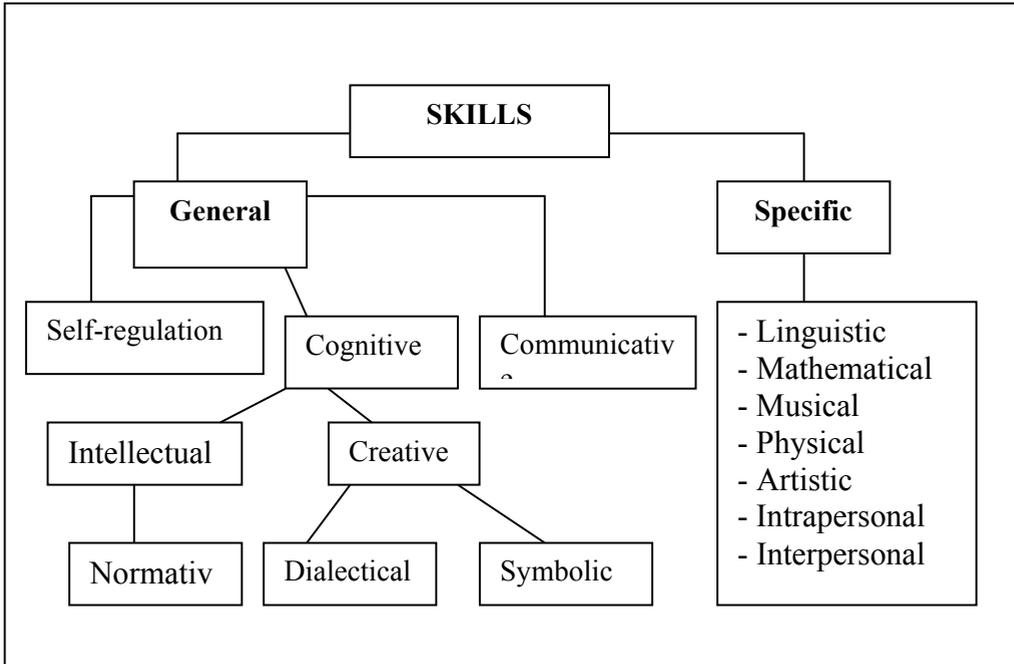


Figure 1. Classification of the learning skills by Diachenko & Veraksa (1990). Adapted from Dolya (2010, p. 15).

Based on the contributions by Zaporozhets & Elkonin (1971), Venger (1988), Veraksa & Veraksa (2006), Dyachenko & Veraska (1990, 1994) and other members of the contemporary Russian Vygotskian school, Dolya and Veraksa has developed the KTL program aimed at improving the general learning skills (self-regulation, communication, cognition) of children aged from 3 to 7 years. The acquisition of human culture not only depends on specific knowledge and skills, but also on the signs and symbols we use to analyze the reality. Therefore, the level of acquisition of these signs and symbols will determine the achievement of the different specific skills. Through the assistance and scaffolding carried out by adults during structured educational sessions, the children will be able to acquire and master these techniques or cultural resources, such as the understanding and use of diagrams, mathematical formulas, models or representations of objects.

#### Psychopedagogical principles underlying the educational program "Key to Learning"

In line with the sociocultural conception arisen from Vygotsky's approach, human development is the result of the acquisition of psychological and cultural artifacts resulting from the processes of teaching and learning, socioculturally scaffolded, which allow the assimilation of the historically inherited culture (Esteban, 2010). Specifically, the educational program KTL recognizes three types of teaching and learning processes, namely: 1) the teaching model; 2) the cooperation model; and 3) the autonomous model (Dolya, 2010).

During the educational sessions of the KTL program, these three models or action strategies are combined. In the teaching model, an expert or teacher suggests to his pupils a series of activities, which include the use of games and psychological tools, or the promotion of discussions and reflections. In the cooperative model, the teacher plays with the children in order to create joint activities. Finally, in the autonomous model, the learners develop skills independently of the tutor, whose work here is to organize the environment, to observe the spontaneous playful activity of the children, and to offer support wherever necessary. In this way, during the shared activities that the KTL program proposes, the teacher is able to share his knowledge with the children and to model and mediate the use of mental tools (Learning model). In the same session, the teacher may also collaborate actively in the creation of a shared result through joint action (Cooperative model). Finally, children are expected to continue using by themselves what they have recently learned, as well as to experience, manipulate and freely play with the objects and activities proposed (Autonomous model).

Therefore, the psychopedagogical foundations of KTL are based on four educational resources such as the cooperative work, the modelling, the productive imagination and the use of external mediators. The cooperative work is inscribed, inevitably, under the Vygotskian approach of the learning processes. Creating zones of proximal development, as suggested before, requires people competent in the use of a concrete instrument to explain the functioning involved in its execution. As people have different abilities, skills and competences, knowledge is always asymmetrical. Therefore, the communication and mutual help among learners is useful to develop their knowledge. In the KTL this is achieved through various activities using external mediators, such as the maps in the visual-spatial intelligence curricular unit, or the Venn diagrams in the logic curricular unit, artifacts that help children to internalize or acquire concepts and skills involved in each educational unit.

In relation to the scaffolding, the KTL program differentiates between "visual modeling" and "creative imagination". By "visual modeling" we understand the ability to "move" information from something concrete to something abstract, by means of a visual model and using substitutes (signs and symbols) which facilitate the development of problems (encoding process). On the other hand, by productive imagination we understand the ability to decode or read information represented in signs, numbers, letters and abstract drawings, and to move it and transform it into something concrete (Dolya, 2010). According Veraksa and Veraksa (2006) the children's learning skills are determined by their level of development in these two inverse processes: visual modeling and productive imagination. For example, using a real picture, the figures of a father, a mother and a son, can be represented by a square (the father), a round (the mother) and a smaller square (the son). This is the encoding process that characterizes the visual modeling: the translation of information to models, using signs and symbols. In the given example, this occurs with the use of geometric figures representing human beings.

On the contrary, we can imagine different realities from an abstract model such as a circle. This circle can be drawn so that it looks like a sun, a flower or a human face. This decoding process, where the information represented by signs, letters, numbers or drawings is transformed, constitutes the creative imagination. For Venger (1988), the ability to generate these encoding and decoding processes allows the development of cognitive competencies, and represents the major intellectual development in the preschool ages. On this basis, the KTL program offers different tasks aimed at fostering the processes of visual modeling and productive imagination. Some examples of these tasks are the substitution of objects (a pole

standing for a building), the analysis of the structure of different objects and the identification of the spatial relationships among them (using a diagram or map), the employ of logical relationships (i.e., to classify objects into categories), and the creation of new images (i.e., to create an elephant from certain geometric figures).

Next, these encoding and decoding processes will be illustrated with examples from the different curricular units of the KTL educational program.

### The twelve curricular units of the “Key to Learning”

The KTL program is materialized through 12 curricular units designed to be put into practice with children aged from 3 to 7 years. Each subprogram or curricular unit is made up of sixty sessions intended to improve the general abilities of the children, their communication, cognition and self-regulation. Below, the objectives of each subprogram will be described and exemplified with activities.

The curricular unit “Sensory Mathematics” aims to develop the ability to analyze the visual and external qualities of the objects using sensory standards such as the color, shape and size. According to Venger (1988), the sensory standards are socially elaborated representations about the characteristic sensory patterns of objects, and their acquisition permits to raise the perception from a natural to a superior level of functioning. It is precisely in the preschool period when a transition occurs between the acquisition of isolated standards to an internalization, practical command, and automatic application, of a culturally originated system of sensory standards. Such a process plays an essential role in the mental development of the children (Bodrova & Leong, 2003). One activity from this subprogram is based on the use of three “magic glasses”. In this activity, the teacher helps the children to create three glasses with different shapes. The first glasses are squared and the child searches for all squared objects, while the other glasses are triangular and circular. The children put on the glasses and only choose those objects which have the shape represented by the glasses. The objective of this activity is to analyze the external shape of the objects using this sensory standard.

The “Logic” subprogram is designed to develop the ability to analyze objects and events, to see their hidden sides, to identify the most essential features, to think following a certain sequence, to draw conclusions, and to categorize information. In one of the activities called the yellow flowers, the children are requested, with the help of a Venn diagram, to put objects into groups depending on the category they belong to: the “yellow family”, the “flowers from yellow family”, and “flowers in general”. Thus, one single object like a yellow flower would belong to the categories “yellow family”, “flowers from yellow family” and “flowers in general”, whereas another object, such as a yellow butterfly, would only belong to the category “yellow family”.

The activities grouped in the “Mathematics” curriculum use visual models through which children discover the language of mathematics (the concepts of measurement, comparison and relationship). For example, in one activity children are asked to make a certain number of claps (or tongue clicks, eye winks...) according to the number of buttons that the teacher has in his hand.

Another area of the curriculum, called “Story Grammar”, aims to foster the love for stories, as well as to help the children to understand the language and its characteristics. For instance, the strategy of visual modeling can be used through story telling, encouraging the children to represent the story characters with geometric figures. In this sense, the action of the story is repeated, first with drawings of the characters and then with geometric figures. Little Red Riding Hood, for example, may be represented by a red circle, and a grey circle would represent the wolf.

The “Developmental Games” area has the objective to develop creative imagination, symbolic alphabetization, linguistic and communicative abilities, flexible thinking, self-regulation and creative problem-solving. We can promote, for instance, the development of the creative imagination using exercises such as showing a triangle, a square or a circle to the children, and asking them what may these figures represent. The circle, for example, could become a ball, a plate, the sun, a flower...

The subprogram “Artographics” is designed to cultivate the skills required for writing and the creative artistic expression, by introducing different symbolic instruments such as the composition, the rhythm and the color. An example is an activity where the children listen to different types of music with different rhythms, and they express through a free drawing what they feel and think.

The “Visual-Spatial” unit seeks to develop the spatial consciousness and the ability to read and understand maps. Children are expected to look at objects in space and to represent what they or others see by using different symbols (maps, schemes...). For example, the activity called “from a different point of view” is aimed at helping children to understand that things can be viewed differently depending on the observer’s position in space. The procedure is very simple and consists in placing the pupils in different places of the classroom. Then, the children guess what the replica of a giraffe would see from a specific location of the room. After that, the animal’s positions changes and children should understand that the animal’s view is modified accordingly. In a second phase, the children, aged from 5 to 7 years, are asked to draw a map of the class and to place the door, the windows, and the tables in their correct position. Finally, the teacher gives the children some representations of the chairs, so they have to place them in the picture and indicate where their own chair would be.

In the subprogram “Creative Modelling”, the children create, by means of the cooperative activity and the manipulation of geometric shapes, artistic compositions that represent their world. For instance, they may create a big and a little bear using circular figures of different colors (black, white, brown and red) and sizes. They could also create landscapes (snowy, sunny...) where the bears would do different things.

The curricular area focused on “Construction” tries to encourage the understanding of mathematical language and the self-regulation of behavior through the analysis of the structure of objects, and the planning and articulation of their multiple relationships. In this subprogram, “ghost models” are used (Dolya, 2010). These models are 2D or 3D representations lacking some of the aspects necessary to produce or reproduce them. Thus, we might have a castle represented by some lines but the pieces required to construct it in 3D are not specified. The activity “so many slides” will serve as an example for the construction area. In this activity, the children build a 3D representation putting together several pieces (different cubes and geometric figures of various forms and shapes) using a 2D “ghost model”. The interesting

point of the activity is that the model can be interpreted in different ways, so the creativity and flexibility in task-solving abilities are promoted.

In the "Exploration" curricular unit, games, stories and simple experiments are used to help children learn scientific concepts such as the states or the different qualities of substances. For example, in one activity called "Playing with symbols. Ice, water and steam", the children perform different actions following certain symbols or instructions given by the teacher, such as: "when I say cold, you have to wrap up with your hands" or "you have to pretend you are swimming when the ice melts because of the sun". The objective of this activity is double. In one hand, it intends to consolidate the knowledge about the three states of water. On the other hand, the understanding of these states is put into practice through the introduction and use of symbols for water, heat, cold...

The subprogram "Expressive Movement" aims to develop emotional intelligence, nonverbal communication, creativity and imagination, through body movements, gestures, facial expressions and music. In the activity "Let's drive the car", different movements are simulated, for example, stopping a pretend car when the teacher says "stop", or moving into the direction indicated by the teacher when she says "move". This kind of activity fosters the expression of different movements, while it requires the children to react to verbal and nonverbal demands and to control their own behavior.

Finally, the activities under the generic label "You-Me-World", attempt to promote the knowledge of the natural and material worlds by using symbols and visual models. In the activity "Who lives here?" several figures such as circles are used to represent the members of a family, so the big circles are the parents and the little ones the children. Moreover, the activity is directed to familiarize the children with the addresses and with the representation of houses and families. This activity serves as an example of the above mentioned process of "visual modeling", which consists, as we explained, in moving real, concrete information into abstract models, using signs and symbols, like circles representing people.

#### Prospection and projection of "Key to Learning"

Designed by Nickolai Veraksa, from the Moscow Pedagogical State University, and Galina Dolya, Director of Key to Learning and a co-researcher, the KTL educational program has been implemented to date in approximately 200 schools from England, Scotland and Wales, as well as in about 200 educative centers from Poland. There also exists the goal to implement the programme in Norway, South Africa, Singapore, Malaysia, Thailand, Vietnam and Indonesia.

Despite the fact that there are not published results on the effects of the KTL program, there are preliminary results that indicate its positive effects. Madeleine Portwood, from the University of Durham, has reported in a personal letter that the program has had effects on different psychological processes (attention, fine motor skills, linguistic development) in 88 children (55 girls and 28 boys) who participated, during a year, in the process of teaching and learning suggested by the KTL curriculum. Compared to a control group, these children showed a statistically significant higher performance in different measures of language development (vocabulary and storytelling), attention and fine motor skills. Although these results have not been published yet, they will be soon. Moreover, a longitudinal study is being carried out in the University of Birmingham, which will permit to evaluate the long term

effects of the program. In this sense, future publications will determine the effectiveness of the program or some parts of it. On the meanwhile, we suggest general hypotheses that future research could test empirically:

- 1) The KTL educational program may foster the development of general communication and self-regulation skills.
- 2) The KTL educational program may foster the development of general cognitive skills. In one hand, skills linked to the intellectual normative processes, and on the other hand, linked to the creative processes.

More specifically, the children participating in this curriculum, in comparison with a control group, they should demonstrate a higher performance in coding (visual modeling) and decoding tasks (creative imagination), both involved in the psychological development of the children (Venger, 1988; Veraksa and Veraksa, 2006). It is expected that the participation in the KTL program, briefly described here, will facilitate the planning and organization of the children’s activities and behavior, that it will expand their viewpoints and promote creative solutions to different problems. Also, this program may encourage the children to interact happily with other people, to have a positive attitude through learning, to interpret the semiotic systems used by a concrete community, to help them to communicate their emotions and feelings, and to use logic strategies to solve mathematical problems. However, there is the need to apply and evaluate the program in different parts of the world in order to correctly assess its potential and consequences.

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