



Drawing in Pre-school Children as a Strategy for Preparation for School

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Authors' contributions

This work was carried out in collaboration between both authors. Author YS designed the study, wrote the protocol and supervised the work. Authors YS and LQ carried out together all laboratories work and performed the statistical analysis. Author LQ managed the analyses of the study. Author YS wrote the first draft of the manuscript. Authors YS and LQ managed the literature searches and edited the manuscript. Both authors read and approved the final manuscript.

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ABSTRACT

It is well known that pre-school age is the period of great importance for psychological development and for preparation for school. The process of learning and achievements at school depends on the types of activities selected at pre-school level. Unfortunately, it is often to find out that introduction of writing and reading is among the most common activities in pre-school institutions all over the world. The goal of our article is to share a formative experience of drawing as suitable activity for children development at preschool age. Mexican and Colombian preschool children were included in the study aged between 5 and 6 years. All children belonged to suburban area of the cities state of Tlaxcala (Mexico) and Bogota (Colombia) and assisted to pre-school official level without any kind of previous experience in drawing. The original program for gradual formation of drawing by stages was applied for 8 months daily during 1 hour. The program included different stages with rich activities directed to analyses of objects and its essential features, denomination, classification, differentiation, comparison of objects, analyses of basic shapes and spatial organization of details. After that graphic representation of shapes were used with the help of constant external orientation. All children were tested before and after application of the program. Specific tasks were selected

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from Brief Neuropsychological Assessment [29] for assessment of children. Among the tasks were included: Copy of objects with elements of spatial orientation, free drawing, production of drawings by categorical instructions. After program application children from experimental group showed qualitative positive achievements in graphic representations of objects, spatial orientation, number of drawings and of essential features of represented objects. We conclude that drawing is extremely useful activity for preparation for school learning, especially for writing process. Drawing activity had positive effect for spatial functions and images of objects in visual modality. We suggest that our program might be used in pre-school official institutions with in order to guarantee required level psychological formation of pre-school age.

Keywords: Drawing; preschool development; spatial development; formation of drawing; external orientation; zone of proximate development at preschool age.

1. INTRODUCTION

It is well known that pre-school age is the period of grate importance for psychological development and for preparation for school [1-6]. The process of learning and achievements at school depend on the types of activities selected at pre-school level [7]. Frequently, such activities used in common preschool institutions do not take into account specific necessities of pre-school age. It is often to find out that introduction of writing and reading is among the most common activities in pre-school institutions all over the world. Instead of real and profound preparation just simple mechanistic training of writing is used as preferential method in pre-school institutions all over the world. As a negative consequence, children commit a lot of mistakes in their writing when they start to go to school. Frequently, such difficulties persist till adolescence. According to neuropsychological research, such difficulties are frequently related to poor level of acquisition of spatial functions, such as global strategy of perception both with analytic strategy [8,9]. Another poor aspect of functional element of brain systems is image of objects or specific visual perception. Different studies have detected impropriate development of visual images of concrete objects at the end of pre-school age [10-15].

According to recent neuropsychological studies [16-21], assessment of acquisition writing at primary school related to poor spatial and visual functions permitted to establish specific difficulties:

- Wrong separations of words and sentences,
- Inversions of letters and element of letters,
- Disproportions of letters and elements of letters,
- Absence of the base line in writing.

According to such data, specific development of spatial orientation on different levels (material level by usage of concrete objects and toys; perceptive level by recognition and production of images and pictures; symbolic or materialized level by constant usage and individual creation of different kinds of concrete and perceptive symbols and signs) becomes really one of predominant tasks of pre-school age. The consideration of this task makes it necessary to propose and strategies and methods with inclusion of spatial orientation. Such methods should include the possibility of its permanent application as constant day to day activity in pre-school institutions.

Different psychological studies, within historic and cultural conception of psychological development, have shown the positive effects of usage of method for prevention of school difficulties and diverse aspects of general psychological and cognitive development of children in Russian Federation [22-26]. Similar examples of creation of methods for correction and prevention of learning disabilities exist also in Mexico within historic and cultural conception applied for developmental and pedagogical psychology and child neuropsychology [27,28]. In this particular article we stress the necessity of creation and approbation in practice of pre-school education of new effective methods, which could positively prepare children for future process of learning at school. Such kind of preparation cannot be limited in early introduction of writing itself, but it should propose types of activities, which are at the same time useful and accessible for pre-school children. As an example of useful and accessible activities we propose gradual introduction of drawing activity as a necessity of psychological age and of acquisition of writing at school age. The objective of this article is to share our experience of gradual introduction of drawing activity in pre-

school children in official pre-school institutions in Mexico and Colombia and to show obtained results. In this work we present an example of formative pedagogical process based on neuropsychological and psychological developmental data.

2. METHODS

2.1 Sample

2.1.1 Mexican children

The method was applied in the group of 30 Mexican pre-school children. All children belonged to suburban area of the state of Tlaxcala (Central Mexico, north east from the capital of the country) and assisted to pre-school official level for the first time. The children belong to suburban zone with poor medical, cultural and social attention. The age of children was between 5 to 6 years. All children were regular pupils of official kinder garden. They were assisted preschool education during 1 year: the last year before entering to primary school. The children presented no kinds of problems in their psychological development. The program was carried out by student of Master Program in Neuropsychology for 8 months period.

2.1.2 Colombian children

The same method was applied in Pre-school Institution in Bogota, Colombia. The children belonged to suburban zone of extreme poverty close to Bogota, capital of Colombia. All families compared feature of violence, some children were abandoned by parents, educational level of

parents were extremely low. The children spent their time in official pre-school institution organized by governmental support. The teacher was trained for the usage of our program, which was applied during 6 months in group sessions of 1 or 2 hours per day. The group consisted of 28 children between 5 and 6 years old. The children were pupils of kinder garden level and never have assisted preschool institution in previous age. Pre and post assessment of drawing activity was applied in this group.

2.2 Previos and Post Assessment of Drawing Tasks

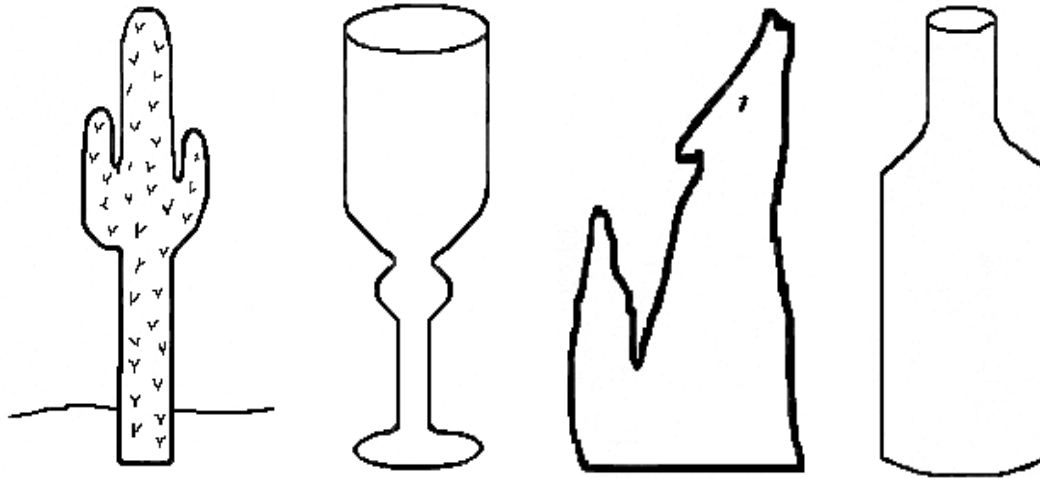
2.2.1 Procedure

Colombian children were tested before and after application of the program. Specific tasks were selected from Brief Neuropsychological Assessment [29] for evaluation of children and other special tasks for drawing were elaborated. Among the tasks were included: Copy of objects with elements of spatial orientation, free drawing, Production of drawings by categorical instructions [30]. The tasks included in the assessment were selected in order to evaluate the grade of development of drawing activity in children. The drawings of children were analyzed in qualitative way according to neuropsychological tradition. General forms of produced drawings, presence or absence of essential details and space orientation were taken into account during assessment.

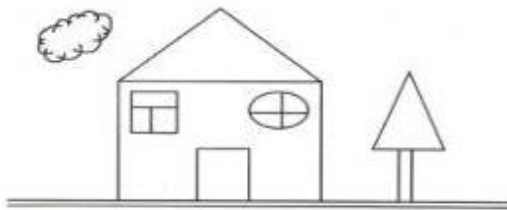
The Table 1 shows the structure of the tasks for assessment of the level of acquisition of drawing activity in children.

Table 1. Assessment of the level of drawing

Task	Instruction
Spontaneous drawing. 3 minutes max.	Draw as much different objects (pictures) as you can. I tell you when you should stop.
Drawing of 6 animals in the sheet of paper divided in 6 squares.	In each square draw one animal. You have to draw different animals.
Copy of 4 objects (cactus, glass, bottle and wolf) (Example 1).	Copy these objects as they are.
Free drawing of 3 objects.	Draw 3 things, which you like more.
Drawing of a square table with 4 legs.	Draw a square table with 4 legs.
Copy of a house (Example 2)	Draw this house.



Example 1. Models of 4 objects for copy



Example 2. Model of a house for copy

2.3 Program

The original program (Solovieva & Quintanar, in print) for gradual stage by stage formation of drawing was created. The program is based on the following theoretical and methodological conceptions:

- 1) Historic and cultural paradigm of psychological development [31] which means creation and elaboration of specific

- types of activities in order to guarantee psychological development of children;
- 2) The theory of step by step formation of mental actions [32] which means to start from external material and materialized levels of actions;
- 3) Orientation base of action during the introduction of new actions [33] which means elaboration of specific kinds of orientation for gradual development of drawing;
- 4) The zone of proximate development, which means the possibility of constant collaboration between adult and child and between children in groups for achievement of common purpose [31].

The program was created according to proposals of activity theory considering psychological structure of drawing: necessity, motive (object of activity), objective (result reflected in consciousness), orientation, means and operations. The Table 2 represents the structure of drawing activity.

Table 2. Psychological structure of drawing activity

▪ Necessity: Social necessity of communication.
▪ Motive: Representation of objects, cognitive broad motivation, formation of esthetic motivation.
▪ Objective: Gradual reflection of the objective for representation of objects and features, real and imaginary situations.
▪ Object: Visual perceptive image of objects.
▪ Orientation: Introduced and shared by constant participation of pedagogue, analysis of features of the objects, external presentation of shapes of the objects
▪ Operations and means: Usage of pencil, colors, paper, shapes and details of real objects, different graphic means.

During realization of drawing activity it is possibly to distinguish specific actions, which have to convert later in operations (operative level). During practical work with the children it is necessary to introduce all these actions, starting from the external level and then passing to internal perceptive level. The pedagogue has to reflect and to organize all these actions together the children. The common actions, which take part in drawing activity, are the following:

- 1) Election of the object which will be drawn;
- 2) Organization of the space of the sheet of paper for representation of the shape and of elements of the object;
- 3) Determination of the general predominate shape of the object;
- 4) Election and disposition of the details of the objects;
- 5) Representation of the shape of object with the help of external shape;
- 6) Representation of specific details of the object;
- 7) Verification of the whole execution, comparison with the model, detection of errors, correction of errors.

The program includes four general stages:

- 1) Previous stage (preparation of drawing),
- 2) Drawing of independent objects according to the shape and external model,
- 3) Drawing of objects which enriched features according to internal model,
- 4) Drawing of situations ("landscape" and "nature mort") according to external and later to internal model.

In this article we present the contents and results obtained after working on the first tow steps of our program.

The Table 3 presents the contents of the work during the first stage and the Table 4 on the second stage.

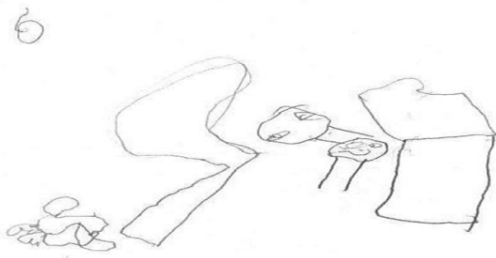
The second stage includes the work on gradual introduction of drawing of object itself. This activity always was base on the usage of models of objects (toys, instruments, fruits, furniture, instruments, animals, etc.) External shapes (triangle, square, circle and so on, all presented as external objects made by paper or carton) are constantly used during this stage.

3. RESULTS

The described program was applied for the period of 8 months with Mexican and for 6 months with Colombian preschool children. The post Graduated student and the teacher were specially prepared and oriented by the authors of the program personally and assisted during the whole work with the program. After program application Mexican and Colombian children showed qualitative positive achievements in graphic representations of objects, spatial orientation, number of drawings and of essential features of represented objects. Our research is a qualitative study, in which we show results of a pedagogical procedure and also examples of fulfillment of drawing tasks before and after application of the formative program. The program is original method for formation of drawing activity in preschool children. The tasks for evaluation of the level of development of drawing activity are of qualitative nature, constructed on the basis of child neuropsychological assessment and of psychological analysis of quality of drawing at preschool age [30].

Example 3 shows execution of the task of the copy of the house (instruction to the child: "Copy this house" as in Example 2) before and after application of the program by a Mexican child.

Example 4 shows execution of the task of free drawing ("draw six animals") before and after application of the program by Colombian child.



Example 3. Copy of the house. before program. after program

Table 3. Contents of activities of the program on the first stage

First stage. Preparation of drawing. External material actions.	Content and examples of activities
Denomination of objects.	Different kinds of toys, objects, animals, instruments which are new and interesting for children.
Identification of all kinds of features in real objects.	Color, shape, spatial orientation, transparent, solid, liquid, big, fat, tall, thin, all kinds of synonyms and antonyms can be used.
Comparison of real objects by the same features. Work with different and similar features of real objects. Identification of similarity in one feature and differences in another feature.	Comparison of all kinds of features in real objects. Shape is used and stressed as one of essential feature of the object. Demonstration of multiple options for differentiation and for identification of similarity in real objects.
Identification of the shape of objects.	Usage of external shapes, made of paper or plastic 5X5 cm (square, circle, triangle, rectangle, oval, star, heart and so on). See Example 3.
Comparison and classification of objects according to the shape.	Constant usage of external shapes.
Identification of spatial characteristics of objects and all details of the objects. Comparison of objects according to spatial distribution of its details.	High – low, close – opened, up – down, close – far, left – right, inside – outside, etc. On the left - on the right, closer – further, etc.
Comparison of perceptive representations of objects according to diverse features stressing the shape as one of the most important.	Pictures, photos, drawings, illustrations, postcards, representations and so on. See Examples 4 and 5.
Symbolic representation of actions with objects and gestures (using hands movement similar to horizontal and vertical line).	How to clean the table, how to paint the wall, how to close the door, how to open the window, how to cut the bread, how to open the curtain, etc.
Symbolic representation of lines on the paper. Usage of vertical and horizontal lines (movement of the pencil) in relation to imaginary symbolic actions.	Same actions as in previous stage and all kind of natural phenomenon: the rain, the rainbow, the sun shining, snow, water, sea, stars sand, grass and so on.
Symbolic representation of shapes. Imaginary analysis of shapes of objects. Proposal an object and its relation to the shape. It in necessary to stress that one object can be represented by different shapes: Table can be round or square or triangle and so on.	Constant drawing of different shapes on the blackboard, on the sand, in space, on the shoulder of a friend, etc. Mentioning of all kinds of objects which could be related to this shapes. Constant usage of external shapes while drawing.

Example 5 shows execution of the task of free drawing (“draw a table with four legs”), before and after application of the program by Colombian child.

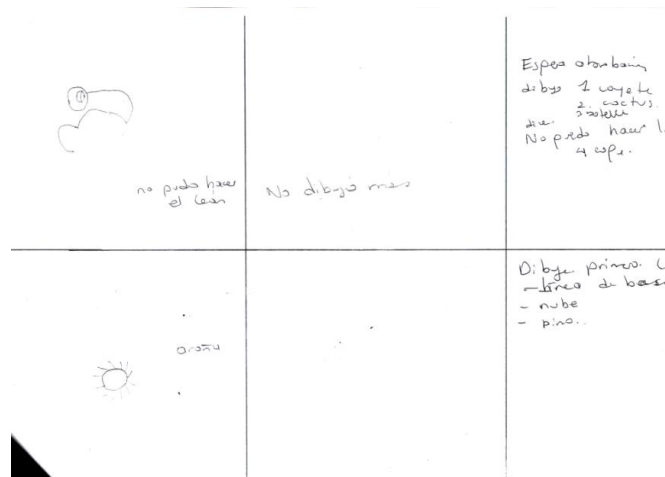
Example 6 shows execution of the task of the copy of four objects (“draw these objects”) before and after application of the program by Mexican child.

Example 7 shows achievements of Colombian pre-school children in the group, while working with the program as an example of creativity of the children. One of the tasks was “to draw a nice joy carpet” and the child has fulfilled the task using the colors and the sequence independently. The help of the teacher was to give examples of colors and shapes of the carpet. The special role of “not using same color for each side of triangle” was used”. The other task consisted of drawing of the “sheep on the

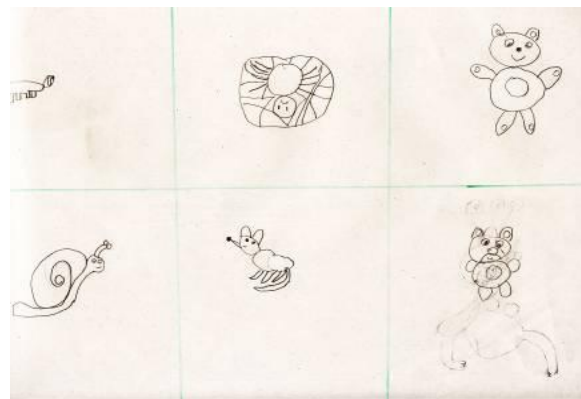
grass". The teacher has helped in this case with showing of the external form and the features of the sheep's. The special role of "using the squares for drawing" was used in this task. Both tasks were carried out on the last month of application of the program.

Table 4. Contents of activities of the program on the second stage

Second stage.	Content and examples of activities
Drawing of objects.	
Perceptive actions with usage of symbolic shapes.	
Observation of an object.	Real objects and toys, as on the first stage.
Identification of general shape.	Usage of external shapes.
Drawing of the general shape on the paper.	Usage of the model and of the external shape.
What is the shape of this object?	
Analysis of features.	Visual and verbal analysis of the features of the object.
How is this object? What feature does it have?	
Drawing of some simple features (color).	Drawing of the features in relation to the general shape.
Which features can we draw?	
Where to draw?	
Which shape to use?	



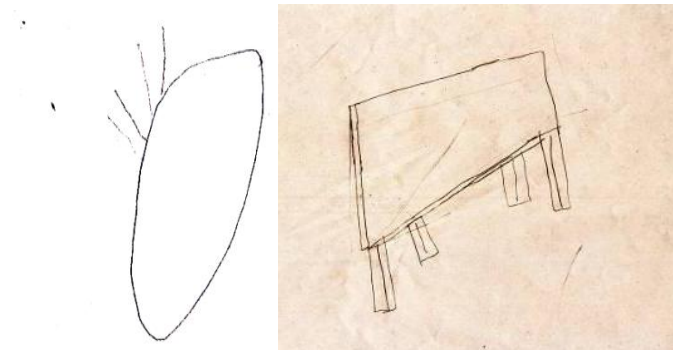
Pre-test, before application of the Program



Post-test, after application of the Program

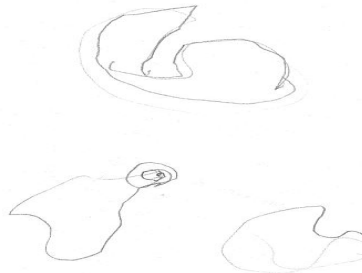
Example 4. Drawing of animals

Pre-test, before the Program Post-test, after Program



Pre-test, before application of the program

Example 5. Draw a table with four legs



Pre test, before the Program



Post-test, after the Program

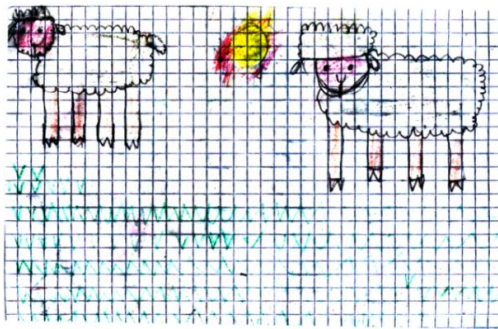
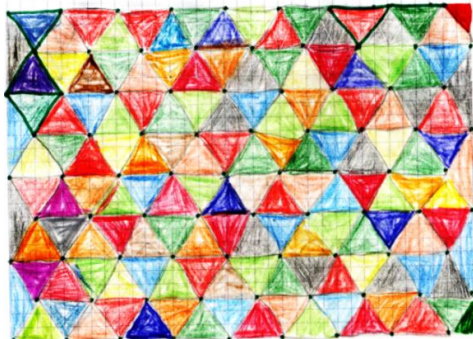
Example 6. Draw these objects

4. DISCUSSION

It is frequently considered that pre-school children are able to express themselves by drawing without any preparation or special orientation. The drawing activity seems to be just the way of spending the time without any special purpose. Generally, the level of acquisition of graphic abilities is very low before entering the

school. As one of the consequence, strong difficulties in writing related to visual and spatial functions appear in primary school. Common methods related to usage of drawing only provide few lessons or sessions without any specific orientation and do not consider psychological structure of graphic activity [34,35]. In such sessions children are only asked what would they like to draw or represent in relation to a

game or to a fairy tail, but they are never explained or guided in how exactly to do it and how to do it properly. Same methods are applied for introduction of reading or creation of perception of global images of words [36]. Perceptive difficulties and errors in graphic representation are always been described as “normal stages of development”.



Example 7. Drawings by the model and verbal analysis of features as creative tasks during working with the program

In other publications, the authors mention importance of drawing activity for assessment of diverse aspects of child’s development or emotional aspects of personality [37]. Again, psychologist only asks children to draw something and afterwards they proceed to analyze children’s mistakes and difficulties without any possibility to improve their executions [38-41].

The present research presents the results of formative activity, introduced by steps according to external orientation offered by an adult. The results are expressed by examples of children production of drawing before and after application of experimental formative program. We may also say that one of the main motivations for the authors of the article was to share new pedagogical and psychological

experience through using a method of formative experiment. The examples, provided in the results evidence qualitative difference in drawing production of Mexican and Colombian children, who took part in the study. All drawing, which we demonstrated before the application of the Program are lack of general form, details and spatial orientation. On the contrary, the production of children after participation in the program is significantly better. It is possible to recognize all produced drawing, to appreciate the global form, details and correct spatial orientation.

In our research, the importance of orientation and organization of activity for gradual introduction of drawing in pre-school age is obvious. Preschool children participated in the program, who were not able to draw at all, have started to produce objects and situations with correct shape, orientation in space and features, but also colorful creative images (see examples). Vigotsky [42] has explained significance of drawing and other kind of artistic and creative activities for psychological development of personality of young children. Afterwards, Davidov [43] has stresses the importance of development of fine perception by enriching all kinds of experience with visual images. According to this author, imagination is one of central requisites of preparation for school. In child neuropsychology, the method of drawing is constantly used as one of the most powerful strategies for overcoming of spatial global and analytic deficits [8,9,44,17,12].

According to historical and cultural conception of child development and activity theory, it is necessary to introduce and to guide the children in their activities. In other words, in is necessary to introduce new activity, which means to use the zone of proximate development. We claim that it necessary reconsider the term of the zone of proximate development. It is not possible to use this term as something general and abstract, but to create, for each case of concrete activity specific conditions in which it possible to work in the “zone”. The followers of Vigotsky’s cultural conception of psychological development have created specific kind of orientation in order to guarantee formation of actions, which do not exist in the child. Recently, the importance of working with perception by drawing dividing between child and ad adult was stressed in research in Venezuela [45]. In this case, the orientation provided by an adult consisted only in verbal characterization of an object or classes of

objects, which were elected for drawing. Another example of such kind of proposal for development of drawing is a serial manuals created by Russian psychologists [24,25]. In these albums the authors present multiple exercises useful for identification of shapes and orientation of lines. All these activities are presented at perceptive level. In our research, we propose to start on material level of concrete objects so that the child could feel and appreciate all features of the objects. After that we pass to perceptive level when we work with lines and images. The materialized orientation is presented all the time on order to facilitate identification of shapes in real and perceptive objects. The introduction of graphic activity is based on initial usage of gestures, actions and external shapes of objects.

Before the program all children have shown absence of developed drawing activity. After program application all children showed qualitative positive achievements in graphic activity such as spatial global and analytic orientation, essential features and shapes of represented objects. As Vigotsky suggested, children became able to express their emotions and the perception of the world, as we can see in examples 10 [46,42]. So, we can say that it is not enough "to help" and "to assist", it is necessary to provide specific psychological orientation or orientation base of action which permits to transform the zone of proximate development into the zone of actual development of the child. Only in this case drawing activity can be formed which can help to prevent learning disabilities.

5. CONCLUSION

We conclude that drawing is extremely useful activity for preparation for school learning, especially for writing process. Our program may be used in pre-school institutions in order to guarantee correspondent level or preparation for school learning. According to historical and cultural conception of child development and activity theory, it is necessary to introduce and to guide the children in their activities: using the zone of proximate development. Our proposal offers a possibility for real practical application of the zone of proximate development in case of introduction of graphic activity.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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