

# Development of voluntary behaviour of senior preschool children using gamification in physical education lessons

*Olga Lutkovskaya*<sup>1</sup>, *Tatiana Rusak*<sup>2</sup>, *Olga Pilimon*<sup>2</sup>, *Natalia Strunina*<sup>2</sup>, *Valentina Yurchenko*<sup>2</sup>, and *Irina Dovzhik*<sup>2</sup>

<sup>1</sup>Department of Physical Training and Sports, Polotsk State University, Novopolotsk, Belarus

<sup>2</sup>Department of Technology and, Teaching Methods, Polotsk State University, Novopolotsk, Belarus

**Abstract.** The article examines the issue of voluntary behaviour as a process aimed at personality development that contributes to the formation of skills necessary for learning at school. Voluntary behaviour manifests itself in various aspects of a child's life, including play activity. Playing children learn to regulate their behaviour. Games with rules acquire a special role, using game rules children have to act purposefully and overcome difficulties in solving a game task. The study of the level of voluntary behaviour development in senior preschool children was carried out using diagnostic techniques. The results of the study showed that at the beginning of the research the pre-schoolers had low indicators of voluntary behaviour. Therefore, a complex of outdoor games with rules was selected for voluntary behaviour development in senior pre-schoolers since they contain a number accompanying conditions that increase voluntary behaviour.

## 1 Introduction

The study of voluntary, consciously regulated movements is one of the most important issues of psychological and pedagogical research. Working out this issue is essential for solving problems related to industrial training, labour organization, physical education, sports activity, as well as, diagnostics and functional therapy of movement disorders [1-4].

The problem of development of voluntary behaviour in pre-schoolers is relevant in connection with the further improvement of the primary and secondary school education and vocational education. Preparing children for schooling involves development of not only cognitive activity but also voluntary behaviour.

Insufficient development of voluntary behaviour in pre-schoolers may cause later such phenomenon as child's desire to go back to preschool, it may inhibit the formation of personality of primary schoolers (for example, appearance of such personal trait as voluntary behaviour) [5-8].

In this regard, one of the most important problems remains the improvement of work of preschool institutions on the formation of voluntary behaviour in senior pre-schoolers in physical education classes using the rich potential of the training functions of outdoor games, game techniques.

The aim of the article is to identify the level of development of voluntary behaviour in senior pre-schoolers.

According to the aim, the following tasks were defined:

- Analyse the problems of voluntary behaviour in psychological and pedagogical literature.
- Study features of voluntary behaviour in senior pre-schoolers.

## 2 Materials and methods

Literary review reveals that voluntary behaviour is considered as the main and central line in child's personality development (L. Vygotsky, D. Elkonin, A. Zaporozhets, L. Bozhovich [9-12].

Awareness or conscientiousness of behaviour is assumed as a fundamental characteristic that determines the specificity of human voluntary behaviour. Awareness of one's own behaviour presupposes its mediation or the presence of some means, which can be patterns, methods of action, rules [13, 14].

Voluntary behaviour is a decisive condition for child's readiness for schooling. It manifests itself in various aspects of child's life: in following the instructions of adults, in ability to plan their actions, in compliance with moral norms and rules of behaviour, in ability to bring the matter to completion, in general discipline, self-organization [15-17].

The organization of life and activities of preschool children is carried out in the form of a game, because it is their leading activity. The value of play activity lies in the fact that it is the first experience of voluntary behaviour, in this activity an ability to voluntary, on one's own initiative, obedience to various rules and regulation of one's behaviour is initially manifested.

Children can choose a game themselves, they can organise it themselves. Children are united by a common goal, joint efforts to achieve it, common interests and experiences. But at the same time only in this activity there are strict rules and conditionality. Therefore, games teach children to subordinate their actions and thoughts to a specific goal, help to educate purposefulness. Play activity is always associated with compliance with the rules, solution of certain tasks, fulfilment of duties, overcoming various difficulties and obstacles. All this strengthens will, fosters self-control, endurance, determination, perseverance in achieving goals, develops an ability to mobilize one's efforts to solve a game task, flourishes self-organization and discipline.

The platform for successful development of voluntary behaviour is an outdoor game with rules. Outdoor games create favourable conditions for raising children's ability to regulate their behaviour, obey rules.

Rules are the main organizational aspect of the game. Accurately formulated, they exclude arbitrary interpretation of responsibilities and actions of participants, eliminate excessive excitement and affect manifestation of positive emotions, encourage children to voluntary tension of attention, develop an ability to self-assess their own actions and actions of others, since they involve comparison [18-20].

The study used general pedagogical methods: analysis and data of literary review, diagnostics. When conducting diagnostics to assess voluntary behaviour, we used the "Graphic dictation" technique developed by D.Elkonin [14].

The following techniques were also used: "A Small Boat", "Mosaic", Pieron-Ruser's technique.

Our research was conducted in two preschools "Nursery –Kindergarten No.4" and "Preschool Child Development Centre" in Novopolotsk. 42 pre-schoolers took part in our study.

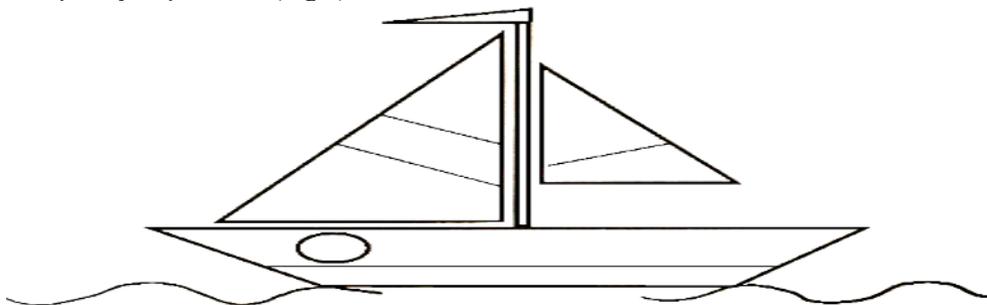
«A Small Boat» technique.

The goal is to determine an ability to perform independently a task according to the visual model.

Means for completing the assignment: a visual model.

Material: a visual model, a pencil, paper.

Instruction: “You can see an image. You are to copy it on a sheet of paper as accurately and quickly as possible” (Fig.1).



**Fig. 1.** A visual model for coping (“A Small Boat” technique).

For assessment, the following indicators were used: the accuracy of the drawing (whether there is smoke, a pipe on the boat, waves and etc.); size preservation of the entire drawing or its individual parts (it is considered a mistake to increase the drawing more than two times); the correct image of the elements of the drawing (smoke rings, hatching, the inscription “sailor”, etc.).

The accuracy of the drawing was assessed in points from 0 to 4.

4 points – the pattern is sketched correctly: the given regularity in size and arrangement of parts is observed;

3 points – the pattern is sketched mostly, minor mistakes are made and children correct them on their own;

2 points –when sketching distortion of the pattern is allowed, children do not try to correct mistakes;

1 point – the pattern does not correspond to the drawing rules.

Interpretation: 4 points – high level; 3 points – average; 2 points – below average; 1 point –low level.

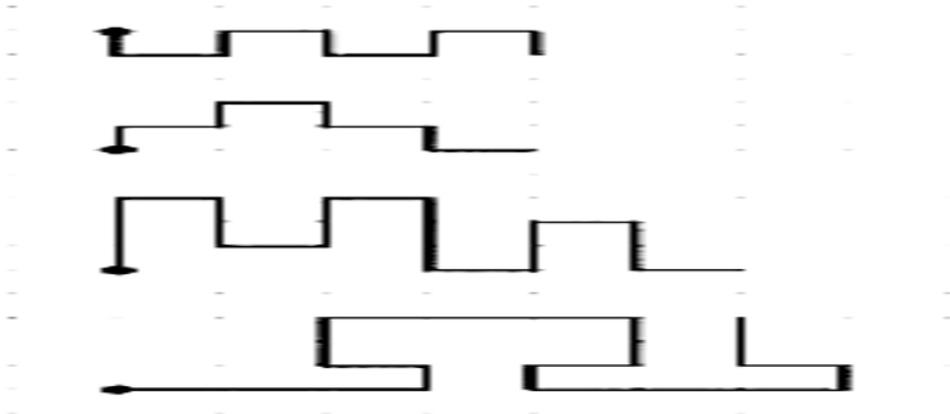
“Graphic dictation” technique

The goal is to define an ability to follow instructions of an adult. The tasks consist of two parts: the first part reveals a child’s ability to draw a pattern on a sheet of quad ruled paper following the instructions of an adult, on the second stage a child has to reproduce the same pattern on his own.

Material: a pencil, a sheet of quad ruled paper.

Instruction: “Now we are going to draw different patterns. You have to try to make them nice and neat. You have to listen to me carefully, I will tell you how many cells you should draw and in what direction you should draw lines. (Fig.2). Draw only the line I am describing. The next line should be started where the previous one ends, without lifting the pencil from the paper”. (At first an adult should find out whether children are aware where the right and left side of the paper is, and show on the model how to draw lines to the right or to the left).

To increase the motivation for high-quality a gamification is possible.” Imagine that we are train drivers and we will drive our trains along the route. The rails along the route are laid with an intricate pattern. It is important to drive our trains strictly along the rails so as not to cause an accident. Be attentive to the dispatcher commands” (Fig.2).



**Fig. 2.** Patterns for drawing (“Graphic dictation” technique).

The both parts are scored separately from 0 to 4.

4 points – the patterns are done in accordance with the task, there are no mistakes. The lines are clear, straight;

3 points –the patterns are done mostly correctly, minor mistakes are made, which a child corrects on his own. The lines are not very clear;

2 points – the patterns are partially correspond to the task, there are deviations from the rules for drawing, a child does not try to correct mistakes;

1 point – the patterns do not correspond to the rules of drawing, a child is confused in directions, a child can not finish the pattern on his own.

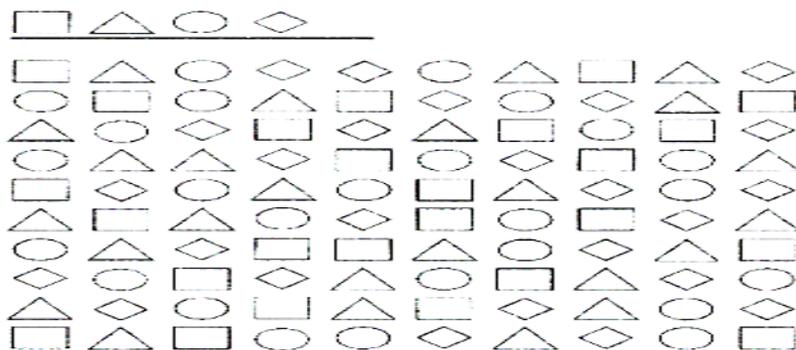
Interpretation: 4 points – high level; 3 points – average; 2 points – below average; 1 point –low level.

#### Pieron-Puser’s technique

The goal is to identify a level of educability, an ability of self-regulation, an ability to follow rules of assignments.

Material: a pencil, a pattern with shapes.

Instruction: “You can see some shapes. You are to fill a shape following the pattern that you have. You are to do it as accurate and fast as possible. At the beginning let’s look at the pattern and try to fill shapes”. An adult should be sure that the children have understood the task and then children can start filling shapes independently when the teacher tells them to begin. The time for filling shapes is two minutes (Fig.3).



**Fig. 3.** A pattern for Pieron-Ruser’s technique.

It is scored from 1 to 4.

4 points – the task is completed quickly and efficiently, without, the number of filled shapes is from 90 to 100, a child is able to complete the task (100 characters) in less time;

3 points – a good quality of fulfilment, no mistakes, the number of filled shapes is from 75 to 89;

2 points – a child fills shapes in slow motion, a child follows the sample; lines are not even, there may be gaps or mistakes that a child corrects on his own; the number of filled shapes is from 50 to 74;

1 point – the number of filled shapes is less than 49. In some cases, a child needs to have repeated instructions several times before starting his work; slow pace, indecision.

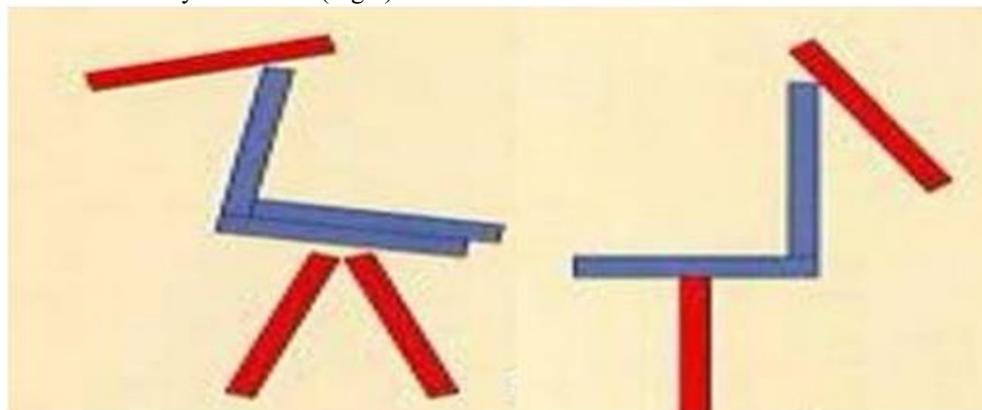
Interpretation: 4 points – high level; 3 points – average; 2 points – below average; 1 point – low level.

“Mosaic” technique.

The goal is to analyse an ability to follow certain rules in one’s activity (laying out a pattern according to a sample).

Material: Cards with samples, counting sticks in two colours.

Instruction: “You can see cards with figurines on them. You are to lay out figurines using sticks. At first, let’s look at the figurines on the cards. Now lay out figurines by you own when I ask you to start” (Fig.4).



**Fig. 4.** A card with a sample (“Mosaic” technique).

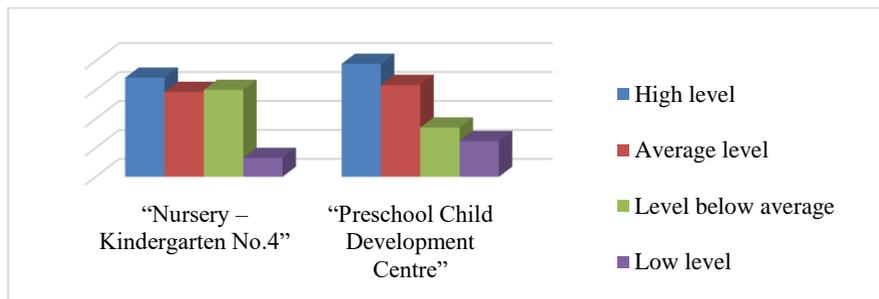
The reproduction quality is assessed on the 10<sup>th</sup> scale.

### 3 Results

Analysing the data of the “Small Boat” technique, the following results were obtained.

The results obtained at “Nursery –Kindergarten No.4”: 34.2% of pre-schoolers got a high level of the ability to carry out independently tasks according to a visual model; 29.3 % of the pre-schoolers got an average level; a level below average - 30 %; a low level – 6.5 % (Fig. 1).

The results obtained at “Preschool Child Development Centre”: 39% of pre-schoolers got a high level of the ability to carry out independently tasks according to a visual model; 31.7 % of the pre-schoolers got an average level; a level below average - 17%; a low level – 12.3 % (Fig. 5).



**Fig. 5.** “A Small Boat” technique.

We believe that the high level of the results is due to the fact that preschool teachers have been conducting some classes aimed at improving hand fine motor skills and thus getting ready for schooling

The “Graphic Dictation” technique was used to study an ability to listen to oral instructions and accurately perform the given task. The test consists of two parts:

1. The goal of the first part is to study an ability of children to follow correctly sequential instructions from an adult.

2. The goal of the second part is to study an ability to reproduce independently a pattern previously drawn under the dictation of an adult.

The results obtained at “Nursery – Kindergarten No.4”: 2% of pre-schoolers got a high level of completing the task; 23 % of the pre-schoolers got an average level; a level below average - 30 %; a low level – 45 % (Fig. 2).

The results of “Graphic Dictation” technique obtained at “Preschool Child Development Centre”: 6% of pre-schoolers got a high level; 34 % of the pre-schoolers got an average level; a level below average - 28%; a low level – 32 % (Fig. 6).



**Fig. 6.** “Graphic Dictation” technique “.

When the children were completing the first part of the task in which they were to draw a pattern listening to the instructions of the adult, there were no difficulties. The actions were carried out without mistakes, at a moderate pace.

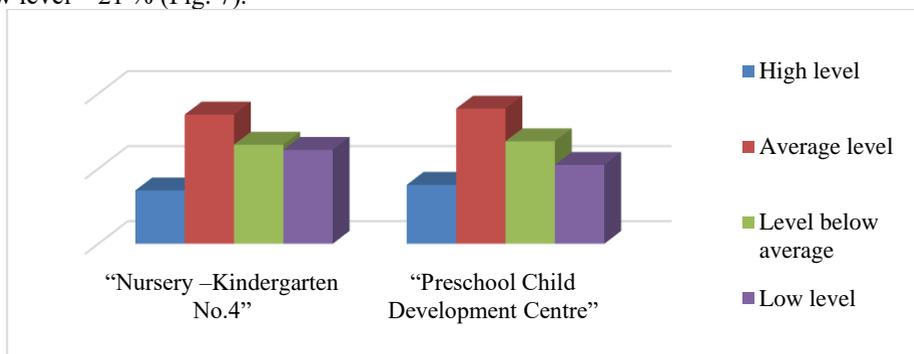
When the preschoolers were doing the second part of the task, they made many mistakes, they acted with uncertainty, they were watching the adult’s reactions and they constantly needed stimulating help from the adult. The more difficult was the task, the more uncertainty was shown and the more mistakes were made.

Thus, the pre-schoolers were coping better with the first part of the assignment where the instructions were given directly in the process of the task.

Pieron-Ruser’s technique determines the level of self-regulation and reveals the level of a child’s learning ability.

The results characterizing the ability of pre-schoolers to orient to a complex of requirements are the following: 14.2 % of the children from “Nursery –Kindergarten No.4” have a high level; 34.4 % of the pre-schoolers get an average level; a level below average – 26.4%; a low level – 25 % (Fig. 3).

As for the children from “Preschool Child Development Centre” the results are the following: a high level -15.7 %; an average level -36%; a level below average – 27.3%; a low level – 21 % (Fig. 7).



**Fig. 7.** Pieron-Ruser's technique.

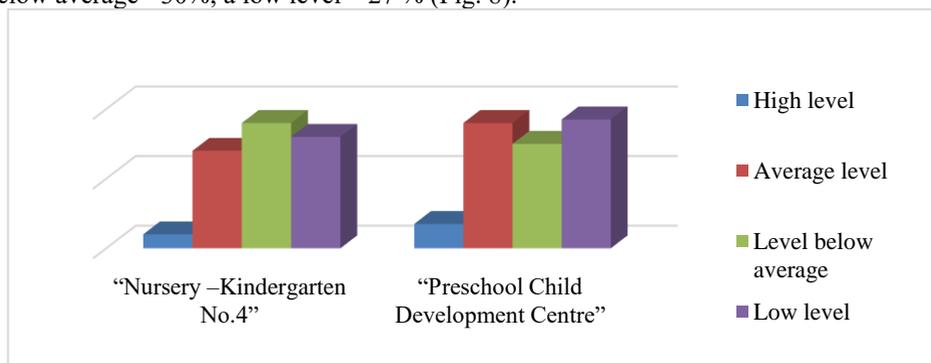
It should be noted that a significant part of the children participating in the study at first refused to complete the task even after being presented with a sample to follow as a hint, explaining it because of their unwillingness.

The majority of the children found it difficult to do a task, they performed it only with the help of an adult with a detailed explanation (reasoning) of an adult and only with visual support. Only a small part of the children used the help of an adult (suggestive and stimulating questions), they could cope with the task using a visual support.

“Mosaic” technique characterizes an ability to follow a system of rules in one’s activity.

The results of “Mosaic” technique at “Nursery –Kindergarten No.4” are the following: 4% of pre-schoolers get a high level; 28 % of the pre-schoolers get an average level; a level below average - 36 %; a low level – 32 % (Fig. 4).

The results of “Mosaic” technique obtained at “Preschool Child Development Centre”: 7% of pre-schoolers got a high level; 36 % of the pre-schoolers got an average level; a level below average - 30%; a low level – 27 % (Fig. 8).

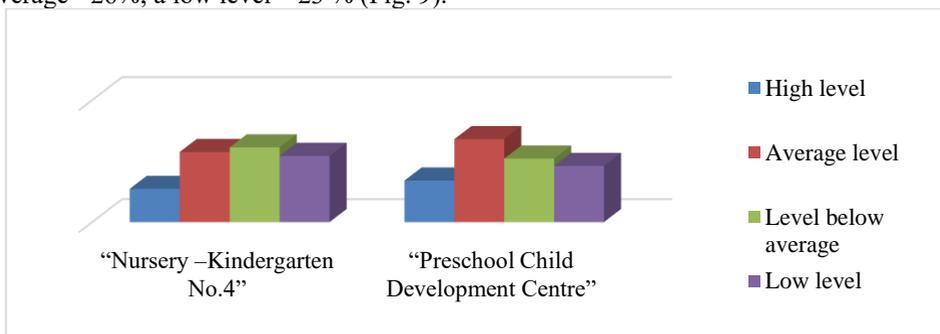


**Fig. 8.** “Mosaic” technique.

The reproduction of the pattern required in the task in accordance with the rules formulated before starting work caused certain difficulties for the children. During the survey, it was found that the children remembered the relevant rules and that is why the reason for the unsatisfactory results could be explained by poor ability to follow the rules in the process of completing the task. This technique and Pierson-Ruser's technique demonstrates the inability of the children to use the rules that are not presented in the process of activity.

The final results of all tests at "Nursery –Kindergarten No.4": 13.6 % of pre-schoolers get a high level; 28.7 % of the pre-schoolers get an average level; a level below average – 30.6 %; a low level – 27.1 % (Fig. 5).

The final results of all tests at "Preschool Child Development Centre": 17% of pre-schoolers got a high level; 34 % of the pre-schoolers got an average level; a level below average - 26%; a low level – 23 % (Fig. 9).



**Fig. 9.** The final results.

According to the results of this stage of the research the children were divided into two groups, control and experimental groups. The control group consisted of pre-schoolers from "Nursery –Kindergarten No.4" and the experimental group – the children from "Preschool Child Development Centre", because their indicators were lower.

The data obtained at the stage of ascertaining experiment are shown in the Table 1.

**Table 1.** The data of the ascertaining stage of the pedagogical experiment on levels of voluntary behaviour of pre-schoolers.

Test Indicators	Low Level		Level below average		Average level		High level	
	EG	CG	EG	CG	EG	CG	EG	CG
«A Small Boat»	(1) 6.5 %	(2) 12.3 %	(7) 30 %	(3) 18 %	(6) 29.3 %	(7) 31.7 %	(7) 34.2 %	(9) 39 %
“Graphic Dictation”	(9) 45 %	(7) 32 %	(7) 30 %	(6) 28 %	(4) 23 %	(7) 34 %	(1) 2 %	(1) 6 %
Pieron-Ruser’s technique	(5) 25 %	(3) 21 %	(5) 26.4 %	(6) 27.3 %	(8) 34.4 %	(8) 36 %	(3) 14.2 %	(4) 15.7 %
“Mosaic” technique	(7) 32 %	(5) 27 %	(8) 36 %	(7) 30 %	(5) 28 %	(8) 36 %	(1) 4 %	(1) 7 %
Final results	(6) 27.1 %	(5) 23 %	(7) 30.6 %	(6) 26 %	(6) 28.7 %	(7) 34 %	(2) 13.6 %	(4) 17 %

## 4 Conclusion

The pre-schoolers coped well with those tasks where they were only to follow rules and elementary instructions of an adult. Their actions were step-by-step, their self-control followed directly the teacher’s instructions.

The children with a low level of voluntary behaviour did not demonstrate initiative in completing tasks, they refused the teacher’s help. The pre-schoolers with a level below average showed more emotional interest and they did not refuse the help of the teacher.

The results obtained allowed us to conclude that the majority of the pre-schoolers had low and below average levels of voluntary behaviour and it requires its development.

According to many experts, particular forms of manifestation of voluntary behaviour are:

The ability to listen carefully to the speaker and accurately perform the tasks offered orally;

The ability to perform independently the required task according to a visual model;

The ability to focus on a given system of requirements;

The ability of children to subordinate consciously their actions to the rule.

In this regard, we assumed that games with rules would be more conducive to development of voluntary behaviour since they contain a number of accompanying conditions that increase a level of voluntary behaviour.

In the framework of our research aimed at increasing the level of voluntary behaviour development in pre-schoolers a set of outdoor games with rules was selected to be used during physical education lessons with gamification. The following groups of outdoor games were chosen for using at the formative stage of the experiment.

- imitative games;
- story games with simple rules;
- plotless outdoor games with rules;
- outdoor games with sports elements.

We decided to have two stages in development of voluntary behaviour at physical education lessons with gamification.

The first stage was aimed at teaching interaction of children in the game, adherence to elementary rules. The children were guided by the system of requirements (rules) to learn an ability to assess the correctness of their actions, to perform independently tasks (according to a visual model and verbal description). At the first stage the following games were used: imitative games; story games with simple rules; plotless outdoor games with

rules (“Crabs”, “Owl”, “Homeless Hare”, “Carp and Pike”, “Airplanes”, “Hunters and Monkeys”).

The second stage was aimed at teaching children to work according to their own plan based on rules. The pre-schoolers mastered team interactions during the game, consolidated an ability to complete independently the task (according to a visual model and a verbal description). At the second stage the following games were used: story games and games with sports elements (“Between the Rings”, “Knock the Ball”, “Ball School”, “Bridge”, “Get into the Hoop”, “Hunters and Hares”).

The implementation of the complex of games is planned during the academic year. After its completion, re-diagnostics will be carried out both in the control and experimental groups. It will allow us to evaluate the effectiveness of the proposed complex of games for development of voluntary behaviour in senior pre-schoolers.

## References

1. Ivannikov, V. A. Psychological mechanisms of volitional regulation (Publishing House of URAO, 1998)
2. Ilyin, E. P. Psychology of the will (St. Petersburg: Piter, 2009)
3. Konopkin, O. A. Mental self-regulation of arbitrary human activity: structural and functional aspect, *Voprosy psikhologii*, 1 (1995)
4. Rudenok, Z. G. The value of volitional qualities in personal self-regulation, *Vitebsk: VSU named after P. M. Masherov*, 7 (2015)
5. Selivanov, V. I. Psychology of volitional activity (Ryazan: RSPI, 1974)
6. Smirnova, E. O. the Development of will and self-regulation in early and preschool age (Moscow: Int-t prakt. psychology; Voronezh: NGO "Modek", 1998)
7. Strunina, N. N. The problem of the development of volitional qualities in ontogenesis, 4 (2008)
8. Khaykin, V. L. The phenomenon of activity in the development of personality (2003)
9. Bozhovich, L. I. Psychological patterns of personality formation in ontogenesis, 6 (1976)
10. Bozhovich, L. I. Personality and its formation in preschool age (*Pedagogika*, 1968)
11. Bozhovich, L. I. Experience of experimental study of arbitrary behaviour, 6 (1976)
12. Vygotsky, JI. C. The game and its role in the mental development of the child, 6 (1966)
13. Zaporozhets, A.V. Selected psychological works, 2 (1986)
14. Elkonin, D. B. Child psychology (Academy, 2004)
15. Kozharina, L. A. The formation of arbitrary behavior in preschool age (1992)
16. Shlyakhta, D. A. Individual-typical features of personality activity in the communicative, volitional and cognitive spheres: abstract of the thesis ... cand. Psychological Sciences: 19.00.01 (2006)
17. Bakanov, E. N. Stages of volitional processes, 4 (1977)
18. Grebennikova, O. V. The role of peers in the formation of arbitrary behavior of preschool children (2006)
19. Smirnova, E. O. Development of will and arbitrariness in early and preschool ages (MPSI; Voronezh: MODEK, 1998 )

20. Finogenova, N. V. Methodology for the formation of arbitrary behavior in older preschool children in physical education classes in the process of preparing for school (1999).