

# DEVELOPMENT OF MEMORY AND LOGICAL THINKING OF CHILDREN OF PRIMARY SCHOOL AGE IN THE PROCESS OF LEARNING THE GAME OF CHESS

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**Abstract.** *In this work, the psychological and pedagogical conditions that contribute to the development of memory and logical thinking of children of primary school age during the learning of the chess game were investigated, and an experimental development technology was developed based on them.*

**Keywords:** *memorizing 10 words, logical thinking, remembering, operative memory, blind walking.*

## Introduction

On January 14, 2021, the Resolution of the President of the Republic of Uzbekistan № RP-4954 was adopted on measures to further develop and popularize chess and improve the system of training chess players. According to the document, implementation of the "Chess in School" project in order to create a chess school of Uzbekistan, within its framework, to increase the coverage year by year by further developing the system of teaching chess for elementary school students in general secondary schools, holding tournaments among schoolchildren, increasing the interest of children and teenagers in playing chess, in this regard, regular organization of chess competitions in educational institutions, neighborhoods and organizations is defined. Several tasks have been defined to ensure the implementation of the tasks specified in the resolution of the President of the Republic of Uzbekistan № RP-347, adopted on August 5, 2022, and at the meeting held on June 30, 2022 - Youth Day, identify talented young people, select and sort (selection), and attract them to professional chess, win prizes in prestigious international chess competitions, expand chess infrastructure that meets world standards, as well as consistently implement the state program for the development of chess until 2025.

Some pedagogues believe that chess has a significant benefit in the intellectual development of a child. In this research, how chess affects the development of children's talent was studied. The great Cuban Grandmaster Jose Raul Capablanca said: "Chess is not just a game. It is an intellectually useful way of spending time, based on some degree of creativity and science. As important as sport is for physical perfection, chess is as important for mental potential. It is an interesting and convenient way to develop special characteristics of people and train the mind". This wonderful ancient game, bringing a lot of joy to a person, is important for his mental development. Chess expands a person's worldview, teaches him to think, remember, compare, foresee the future and draw conclusions. Also, a person who plays chess develops the skills of attention, determination, self-criticism, and independent conclusion.

**Relevance of the topic.** Organization of wide coverage and promotion of chess as an intellectual sport, as well as ensuring the participation of the members of the national chess team of Uzbekistan in international chess competitions are crucial.

At the current stage of the development of the society, the demand for qualified specialists with high intellectual potential will increase and their foundations will be determined during the development of the school.

Analysis of psychological and pedagogical approaches to the problem of intellectual development showed that it depends primarily on the content and logic of the presentation of educational topics.

Among various topics aimed at forming the intellectual abilities of the young generation, in our opinion, special attention should be paid to the study of the game of chess. In some countries of the world, chess training is conducted, including in school courses, and recognizes the high potential of this game as a means of intellectual and personal development of the participants.

The study of psychological and pedagogical conditions that contribute to the intellectual development of children of primary school age and the development of experimental development technology based on them are considered the most valuable.

### **LITERATURE REVIEW AND METHODOLOGY**

In the modern rhythm of life, a person often faces a situation that requires clear concentration and memorization of objects. A person's memory is related to the success of his professional activity, teaching, education and all-round development of a person. Memory is one of the main psychophysiological characteristics of a person, which includes both mental characteristics and physiological characteristics of higher nervous activity.

One of the most important stages of memory development is primary school age. During this period, memory receives the greatest attention of the teacher under the influence of the educational process.

The relevance of the topic is related to the problem of memory development of young students today. Memory is the most important defining feature of a person's mental life.

Memory is the most important part of human life, and the most important period of memory development is primary school age. It is this period that creates the necessary conditions for a more complete formation of memory and its improvement in the future. The importance of memory for a young student is that each subsequent school course is an expanded and complex version of the past based on the application of previously acquired knowledge.

The problem of memory development in primary school has been studied by scientists of such disciplines as pedagogy, psychology, physiology, methodology and others. Special attention is paid for the development of memory of young schoolchildren in the investigations of foreign researchers.

K. Byuler, L.S. Vygotskiy, P. Janet, A.N. Leontiev, A.R. Luriya, P. Maklakov, S.L. Rubinshteyn, I.P. Pavlov, G. Ebbingshausen can be mentioned as scientists who have covered this topic. But in modern science, there is still no single theory of memory. In this regard, there is a need to study the characteristics of memory development in the course of educational activities of children of primary school age.

Memory processes are an important condition for teaching a person various knowledge and skills [6]. In addition, in most cases, voluntary memory is really related to the intellectual activity of a person, which leads to a significant increase in development even in childhood, which is considered the initial stage of growth.

Memory can be defined as the ability to receive, store and repeat life experiences. Innate and acquired mechanisms of behavior are nothing more than various instincts, instilled, inherited

or acquired experience in the course of personal life. If such experience is not constantly renewed, if it is not reproduced in suitable conditions, living organisms cannot adapt to the current rapidly changing life events.

In psychology, memory is usually divided into several types. Each classification is based on a certain attribute, for example: memory size, memory retention time, analyzers, etc. One of the most relevant classifications is classification by time: short-term, long-term, working memory [7]. Each of the types of memory has some differences from each other, which makes them the most important for a person in certain situations.

Short-term memory stores the amount of information that is relevant for the first few seconds. In the most important cases, short-term memory can increase up to 20 seconds [8]. In other words: short-term memory is the basic perception of objects or events, a "photograph" of objects. The information received in the future will be processed by the brain, where it will have a new type of memory - long-term memory.

Primary school age is characterized by the intensive development of the ability to remember and reproduce.

**Leontiev A.N.** from the point of view, younger students have a more developed visual-figurative memory (specific information, events, persons, things, facts). At the same time, during the educational process, favorable conditions are created for the development of more complex forms of verbal-logical memory (definitions, descriptions, explanations).

Thus, we can conclude that memory has a clear cognitive character during this period. At primary school age, the understanding of the mnemonic task changes qualitatively, as well as the memorization technique is formed. The involuntary memory of a young student gradually acquires arbitrary properties and becomes consciously regulated and mediated.

Another educational psychologist L.S. Vygotsky describes the changes in the characteristics of memory in junior schoolchildren after the transition from play to educational activities. With each course, the ability to concentrate increases, the amount of memory also increases its capabilities. [5]

## **RESULTS**

After the transition of students to primary school, another feature manifests itself - long-term memory.

In the process of writing this work, the works affecting the general theoretical aspects of the development of memory and logical thinking were analyzed. This method was used to determine the main methodological approaches to building a teaching and learning process in chess[1].

Later, we conducted a pedagogical observation, in which **20 children of primary school age participated.**

Pedagogical observation took place from September 2022 to December 2022. We created a protocol for pedagogical observation, in which the results were recorded before the start of the experiment and at the end of it.

At the first stage, a preliminary test was carried out to determine the level of development of mental qualities in children.

In the second stage, the sectional program was implemented systematically.

The third (final) - final test (test) was conducted.

Various methods, tests, analysis, etc. can be used to conduct research on the level of development of memory and logic. For example, tests to determine the level of development of various types of memory, etc.

A test method specialized for the type of activity has been developed to study the thinking and memory of a chess player.

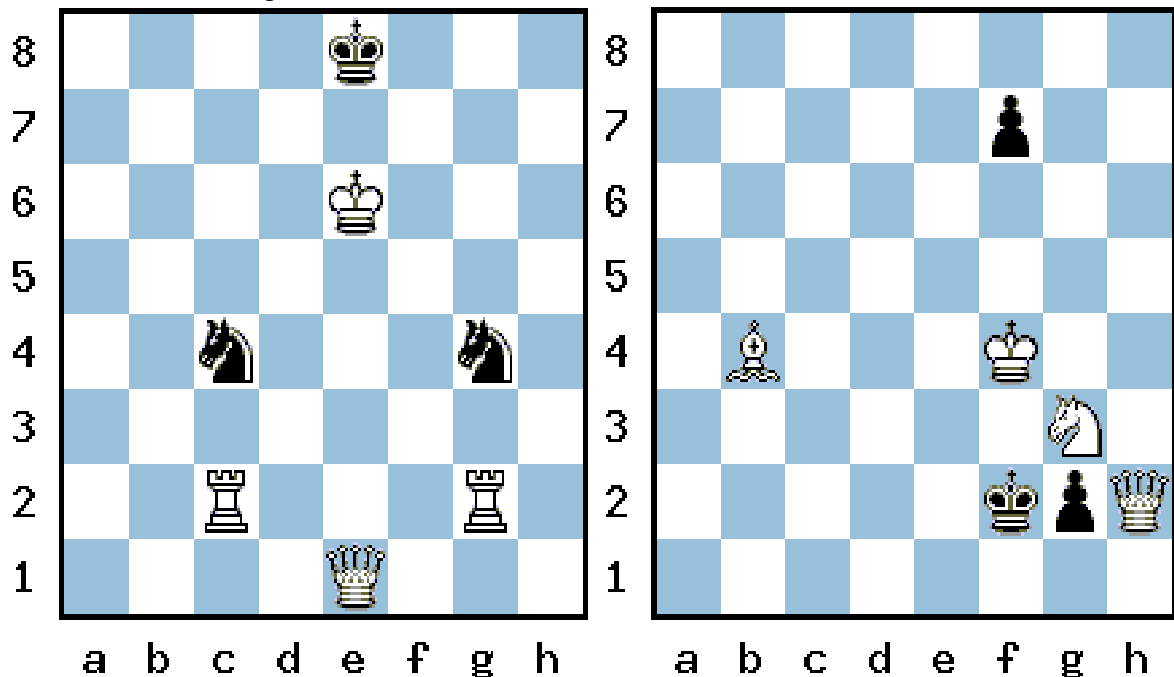
The following exercises are used to train memory:

**1. Positioning exercise.** First, the pieces are placed on the board.

We start with a small number of pieces on a demonstration chessboard. The playing positions used in the recall task were taken from master games after about 35 moves to move with whites from different chess sources. The chess pieces were "quiet" (that is, not in the middle of a sequence of exchanges).

- The first stage. We start with a game position of 6 pieces on the board. The student is given 2 minutes for familiarization and memorization. After the pieces are removed, there is a 2-minute break to place the pieces. After the students have completed the task of restoring their initial positions, they move to the second stage.

- The second stage. Same exercise. We increase the number of pieces and the break time. Sample test is shown in figure-1.



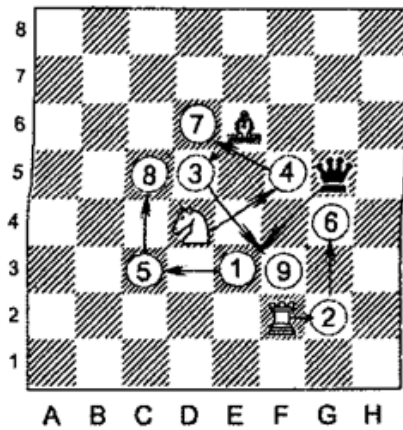
**Figure-1**

**2. 40 moves without looking at the board.[2]**

Place four figures of the same color on the board. At the same time, the teacher orders moves, and the child moves the figures blindly in his mind, writes their names in the notebook:

The description of the professional working memory of chess players based on the analysis of the process of calculating variants by the writing method served as the basis for creating a blank operative memory of chess players (BOMCP) test.

The description of the professional working memory of chess players based on the analysis of the process of calculation of variants by the writing method served as the basis for the creation of the BOMCP test. Such tasks provide an opportunity to obtain materials sufficient for mathematical and statistical processing and objective evaluation of results.



**Figure-2.**

An example of a test with stimulus material (shown in Figure-2) - the expected response of the subject is shown in parentheses:

1. e3 (g5) 2. g2 (f2) 3. d5 (e6) 4. f5 (d4) 5. c3 (e3) 6. g4 (g2) 7. d6 (f5) 8. c5 (c3) 9. f3 (d5)

The test procedure is as follows: the experimenter names the area where the figure should move and the area where the subject can move. Thus, the subject confirms the retention of the image of a combination of numbers in memory, provided that the stimuli presented in succession are changed.

The evaluation of the results of this test is based on the performance criteria E (the ratio of the number of correct answers n to the test time t) and the accuracy A determined by the number of wrong answers or failures n<sub>1</sub>.

$$E = \frac{n}{t};$$

$$A = \frac{n}{n + n_1}.$$

**3. The level of memory development can be studied using the technique of memorizing ten words.** The recommended technique of memorizing ten words was developed by A. R. Luria [3] and allows studying the following memory processes: memorize, save and increase.

It can be used in practice to assess the state of memory and the level of development of voluntary attention.

**Here is a collection of words:**

1. Table, water, cat, forest, bread, brother, mushroom, window, honey, house.
2. Smoke, dream, ball, fluff, bell, bush, clock, ice, night, tail.

Procedure for doing the task: The teacher instructs the subject: "I will read 10 words now. Your job is to listen carefully. After I finish reading, you must repeat the words that you clearly remember". Words are read slowly and clearly. In the test protocol, the order and correctness of repeating words after each presentation is determined by a number (the order in which words are repeated can be informative in analyzing the way material is remembered).

In some cases, the subject is asked to repeat the words for an hour or even the next day in order to learn to remember the memorized material.

Data processing and analysis is carried out as follows. After each presentation, a graph is made based on the calculation of the total number of repeated words: the number of repetitions is marked horizontally, and the number of correctly repeated words is marked vertically. First of all, it is important to qualitatively evaluate the research results: according to the nature of the implementation of the methodology, it is possible to evaluate the properties of memorization, reproduction and storage, as well as human fatigue.

In psychology, thinking is understood as an activity based on the ability to quickly and accurately perceive an object, quickly assess the situation, make decisions, and change the strategy and tactics of game behavior.

Unlike memory, which is manifested in chess in the mental retention of a constantly changing situation on the board, thinking determines the ability of a chess player to solve problems

of a heuristic nature. This ability significantly reduces the number of options needed for calculation and is reflected in the specification of the strategic or tactical idea found in the position and the choice of action.

**4. The following "8 queens" exercise was used to develop logical thinking:** [4] the task is to place 8 queens on the board, ensuring that they do not "hit" each other or threaten each other.

The proposed test concept includes the joint manifestation of some of the listed abilities. To facilitate standardization, test items simulate situations in which regrouping of their digits is performed. Situations that require the manifestation of the "thinking in schemes" method are mainly chosen as the object of study.

Evaluation of the results is carried out according to the same scheme as in the first test.

**Table 1.**

General results of experimental work from September 2022 to December 2022.

№	Name	Positioning, number of pieces		40 moves, number of moves		10 words, number of words		"8 queens", minutes	
		Before the research	After the research	Before the research	After the research	Before the research	After the research	Before the research	After the research
1	Ikromov Bekchonboy	6	12	15	29	6	10	13	8
2	Davlatnazarov Shoxruz	7	14	13	26	8	10	14	7
3	Matkarimov Azizbek	8	14	11	23	5	8	15	8
4	Quronboyev Mustafo	7	13	8	20	7	10	12	6
5	Norboyev Shahriyor	9	15	13	27	6	8	18	9
6	Shonazarova Maftuna	6	14	12	25	8	10	14	7
7	Norimonov Jaloladdin	8	14	9	21	7	9	18	10
8	To'htaboyeva Charos	7	13	13	24	5	8	16	9
9	Egamberganov Farruxbek	6	12	10	22	7	10	17	8
10	Muxtorov Bilolxo'ja	8	13	9	20	6	9	16	8
11	Sa'dullayev Kamolbek	7	12	11	23	8	10	17	9
12	Quryozov Javohir	7	12	13	25	5	8	15	7
13	Qudratov Muhammadali	9	15	10	23	6	10	16	8
14	Davronov Abdulaziz	5	10	14	27	7	10	17	7
15	Sheripbayeva Laylo	7	13	8	20	5	8	18	9
16	Shomurodov Doniyor	9	16	11	21	8	10	14	7
17	Otajonov Fazliddin	6	12	13	25	6	10	13	6
18	Madaminov Ibrohim	8	15	12	25	6	9	18	9
19	Ilhomova Zilola	6	11	14	29	8	10	15	7
20	Soliyeva Zulayho	5	11	16	30	7	10	14	7
$X \pm$		7.05	13.05	11.65	24.25	6.55	9.35	15	7.48
$\sigma$		0.96	1.16	1.85	2.55	0.95	0.78	1.33	0.55
%		45.9%		51.9%		29.9%		50.1%	

### **Conclusion**

1. Analyzing literary sources, we can come to the following conclusion: chess is an effective tool for developing memory and logical thinking in young schoolchildren. All educational cycles aimed at developing mental processes should be built purposefully.

2. Both well-known methods and special educational tasks can be used as a psychological-pedagogical tool for evaluating the development of memory and logical thinking. As a result of scientific research in the "Grandmaster" chess club, a positive trend was shown in the development of logical thinking and memory of children of primary school age.

This is confirmed by research results and test data (shown in Table-1). Improvements are expressed in the following percentages:

- "8 queens" test - 50.1%;
- "40 moves" test - 51,9%;
- "10 words" test - 29,9%;
- "Positioning" test - 45,9%

3. With the help of chess, intelligence develops, children learn to be persistent in achieving their goals, develop the ability to solve logical problems under time pressure, train memory and develop attention, because a chess player is very careful and must remember hundreds of moves and options for games.

Methodical approaches to developing memory and logical thinking among young students were studied at the current stage of the work process.

Selected psychological-pedagogical tools and literature were used to assess the development of memory and logical thinking in the classroom in the chess section of children of primary school age.

4. In the game of chess, not only the development of logical thinking and memory, but also the stable trend of increasing the performance of elementary school students in various school subjects can be noted.

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