Determining logical teaching methods and techniques for primary schoolchildren's thought and language development

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Aabstract

This paper considers one of the relevant problems of modern pedagogy - the use of logical approaches in teaching to the development of thought and language of primary schoolchildren. The purpose of the study is to determine the main criteria for the developmental education of thought and language to primary school children and to assess the level of schoolchildren before and after the experimental work in the process of completing tasks using logical approaches. The study involved 150 3rd grade primary schoolchildren: as an experimental (76 schoolchildren) and control (74 schoolchildren) groups. The experimental work carried out gave exhibited that the use of logical approaches in teaching schoolchildren of the experimental and control groups made it possible to improve the basic skills of speech development of schoolchildren and thinking from low and medium to medium and high levels, respectively.

Keywords: Developmental education; language; primary school pedagogy; thought.

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1. Introduction

The scientific outlook of primary schoolchildren is realized through the development of their thinking and language (Uaidullakyzy et al., 2021). The scientific worldview is formed not only based on theoretical knowledge but also as a result of consistent evidence, and correct thinking. In general, the internal properties, meaning, mystery, signs of objects, and phenomena that are not recognized by the senses are recognized only as a result of judgment. After that, it does the conclusion. Therefore, it is important to develop the thinking and language of schoolchildren using advanced learning technologies in the education system, including in primary education. In the psychological and pedagogical literature, the main attention is paid to research on the development of intelligence, independent creativity, critical thinking,g and logic of schoolchildren, with an emphasis on research aimed at joint activities, taking into account the age and psychological characteristics of schoolchildren (Piaget 1969; Galperin 1985; Vygotsky 2003). In turn, it is based on the introduction of effective forms and methods of teaching, including the formation of life skills in primary school children based on the needs of an individualized learning strategy, and the development of thinking and language of primary school children through the interaction of a teacher and a learner.

In the state program for the development of education in the Republic of Kazakhstan for 2020-2025: increasing the global competitiveness of Kazakhstani education and science and educating an individual based on universal values pursue the goals of ensuring the intellectual, spiritual, moral, and physical development of the student. In this regard, the formation of smart, comprehensively developed, able-bodied, independently working, self-sufficient, and self-improving professional skills through raising the level of education are the main issue in the field of education. The growth of the scientific and technical potential of the state requires an increase in the level of effectiveness and development of mental activity in the primary education system. Obviously, at the present stage of the f development of Kazakhstan, the relationship between science and education is the main driving force behind economic growth, increasing its efficiency and competitiveness.

In this context, great importance is attached to the formation of logical thinking and the development of speech at school from the primary grades. Textbooks developed by the updated content of education include tasks performed through logical operations (Akpaeva, Lebedeva, Mynzhasarova, & Likhobabenko, 2018). Such tasks, in turn, are aimed at developing the thinking and language of schoolchildren. Thinking skills and experience of schoolchildren will deepen as early as secondary school. In this regard, there is an increasing need to use logical approaches in the development of thinking and speech of schoolchildren.

Thought is the highest form of reflection of the external world. While thinking is one of the most important functions that play a large role in the mental development of a school-age child, the thinking form and the logical form are a way of connecting the structure of thought and its elements. The main forms of thinking are concept, judgment, and conclusion. And language is a special form of internal actions corresponding to the structure of external actions. Creating various techniques with language objects is a natural sign of thinking. The implementation of interiorizing actions is closely related to the language. Language raises the perception, preservation, and use of external influences to a new quality. Through language, the influence of the outside world on a person acquires a social character, he/she develops, expands, and elevates the changing function of language. The language preserves the continuity of generations and serves as a successor. Therefore, thinking is inextricably linked with speech, this is a phenomenon inherent in humanity as a whole, and language is a peculiar expression of each nation on, people.

In the context of learning, which today is a relevant problem, the objectives of the lesson are aimed at increasing the cognitive activity of schoolchildren. Children cannot independently form logical thinking at the level of cognitive development from the moment they enroll at school. The teacher must lay the foundations of logical knowledge and skills. Taking into account the age capabilities of

children, it is necessary to work out the material with the obligatory pronunciation of each action, each action (Sydykhov et al., 2018; Yesnazar, et al., 2021).

From the studies carried out, it can be concluded that the application of logic has many aspects related to the process of teaching subjects in primary school, and is a more urgent problem than it takes time. When studying subjects in primary schools, schoolchildren have enough reason to study methods for acquiring the elements of the science of logic. First, thinking and language is a system that is directly connected. Secondly, since our research work is to develop the thinking and language of schoolchildren through developmental education, it is necessary to provide ways for acquiring the elements of logic by the schoolchild.

Developmental education is a process that underlies the laws of development in real life and being. Among the new technologies, one can single out the theory of developmental education. And the scientific substantiation of the process of developmental education has developed in connection with the name of Vygotsky (2003). He notes that the most important regularity of psychology is the implementation of the development of education (Vygotsky, 2003). Zankov (1999) created a developing system of education for young guardsmen (Zankov, 1999). Its main principles are: sorting the content of learning, methods, and techniques aimed at perception, language, thinking, and creativity, finding relevance in the process of performing additional material and resolving contradictions. There are several theories of scientists that are consistent with this statement (Elkonin 1989; Davydov 2000).

The cognitive means necessary for the successful mastery of logical actions (analysis, synthesis, comparison, generalization, design, logic of a logical chain, hypothesis) in teaching the development of thought and language in primary school children is knowledge of the school curriculum subjects. Numerous studies of outstanding representatives of Russian psychology (Lyublinskaya, 1981; Uaidullakyzy et al., 2021) allow us to assert that success and high results in the formation and development of the logical thinking of primary school children are directly related.

Logical training is a necessary and important element in the training of schoolchildren and is closely related to psychological, pedagogical, methodological, and special training. The results of many pedagogical studies testify to the expediency of the formation of general logical skills in the process of education in primary school and high school, and the ways and necessity of equipping schoolchildren with methods of scientific knowledge, methods of logical thinking are considered (Zorina 1978; Ikramov 1981; Lerner 1981; Rakhymbek, 1998; Kurmanova 2004; Zhapbarov 2015). The content of the general logical training of schoolchildren is determined by the list of skills that make up the so-called logical literacy.

In the course of analyzing these works, taking into account the age characteristics of primary schoolchildren, we took as a basis the following principles for the development of speech and the formation of logical thinking of schoolchildren:

1. The principle of connection between learning and life. This approach is of great importance in organizing the process of teaching subjects as a process of acquiring skills and techniques that are suitable for the schoolchild's life. The learning process, based on the formation and development of the schoolchild's thought and language, is based on creating comfortable conditions for the schoolchild to live and develop cognitive potential not only in language lessons.

2. The principle of the systematic character of educational and cognitive activity. In didactic literature, systematization is understood as the totality of a subject, or one course in it. In addition, to the concept of systematic character, on our part, we add the concept of the integrity of skills and methods that are formed for the development of theoretical thinking in the schoolchild. Work on the development of logical thinking of preschool children should be carried out purposefully and systematically.

3. The principle of scientific, comprehensibility of teaching material. It facilitates the correct selection and selection of the content of education in general and the formation of thinking and speech of the schoolchild in learning. This position also determines the need to introduce new materials to match the teaching of disciplines with the requirements of the new time. For example, the line "from form to content", which has been held in teaching for many years, now needs to be used in unity with the line "from content to form". It is known that while maintaining this direction, methods such as component analysis, transformation, oppositional analysis, independent processes of acquisition of theoretical knowledge by the schoolchild begin to be carried out, but at the same time, it is necessary that the schoolchild understands and correctly adapts the scientific material.

4. The principle of taking into account age characteristics, and characteristics of the development of schoolchildren. The peculiarity of educational and cognitive activity lies in the fact that the language is successfully recognized by the subject in which it is, and his/her thinking develops. In fact, in the hadiths of the Prophet Muhammad, PBUH there is propaganda that "the disappointment of a person changes every moment." It must be understood not only religiously, but also scientifically. After all, it cannot be said that the schoolchild who enters the classroom and the schoolchild who finds him/herself in the lesson, is the same. Educational information, which makes up each concept and its content, is a means of changing the thinking and development of the schoolchild. However, it is no longer possible to rely on the course of development of schoolchildren, to conduct experiments, and to increase or complicate the content of education inappropriately. This issue will be guided by a position that links the specifics of the development of the schoolchild with his/her age characteristics.

5. The principle of harmonious application of various methods and techniques, visualization, and teaching aids. The harmonious application of methods and techniques that serve to develop the thinking and language of schoolchildren in the study of basic subjects at the source is a good opportunity for independent work and active educational and cognitive activity of schoolchildren. Teaching methods in general, didactic methods, and cognitive methods should all be located and used in a state in which they arise from each other throughout the process. These positions have methodological foundations and involve the maximum acquisition of knowledge and personal development. All of the above principles are implemented in a system of logical techniques and specially designed tasks that ensure the formation of basic general logical skills.

In addition, in the study, using logical approaches, the methodology, assessment criteria, indicators, and levels of development of thinking and language of primary school children were determined. The model of the study consists of three components: a motivational-target component, a content-activity component, and an evaluative-reflexive component (Table 1).

Table 1

Criteria and indicators of the development of thought and language of the primary schoolchildren through logical approaches

Component	Values	Indicators
Motivational-target	Motivational-value attitude to increasing knowledge through logical techniques	- the presence of interest of primary school schoolchildren in the development of thinking and speech through logical techniques; - awareness of their importance and the desire to participate in the actions of this appointment
Content-activity	Availability of knowledge about logical approaches	- systematic knowledge of the updated content of education in the teaching of disciplines; - mastering the implementation of thinking and speech through logical techniques; - cognitive-logical activity
Evaluative-reflexive	Development of thought and speech as a result of the use of logical	- evaluates the outcome achieved through their cognitive and logical interests, using logical techniques;

techniques	- can distinguish signs of concepts; - can make correct judgments and conclusions when implementing logical techniques

The first component of the model of developmental education of thought and language to primary school children is associated with goal setting. When determining the content of the motivational-target component, using logical approaches, we indicate that the motivational-target component reflects the teaching material necessary for the development of thinking and language of primary schoolchildren. This component is compiled by taking into account the requirements for a person in the field of education. The development of thinking and speech school childrenren in primary school through logical techniques is to broaden their horizons, develop the need for self-improvement of logical thinking and speech schoolchildren, reveal personal searches and cognitive abilities of schoolchildren, and the possibility to apply the acquired knowledge in practice. It includes the state educational standard, the updated content of education, the content of the subject based on the development of thoughts and language of schoolchildren, and an elective course for the development of thoughts and language of schoolchildren.

The content-activity component presupposes an ordered unity of the context, that is, the content of subject material aimed at developing the thought and language of primary school children, and an integrative course aimed at developing the thought and language of primary school children through logical approaches in the process of teaching mathematics. The content-activity component provides an activity that is formed in school children with the system in the development of thinking and language of primary schoolchildreschool childrenrencal techniques. The indicators obtained by knowledge and skills about logical knowledge are systematic knowledge and activity in designing an information educational environment in the study of methodological disciplines.

The evaluative-reflexive component is an inquisitive, cognitive person with an outcome, who owns effective methods of logical methods, forms logically correct thinking and correct speech, and is able to independently manage his/her actions and personality. Each of the listed components has a set of features and skills that make it possible to determine the level of formation of the corresponding component in primary schoolchildren. This model, built on teaching the development of thinking and language of primary schoolchildren using logical approaches, can become the foundation for the implementation of the process by performing various mental operations.

The above criteria and indicators using logical approaches determined the following levels (high, medium, low) of developmental education of primary school schoolchildren in thinking and language (Table 2).

Table 2

Levels of developmental education of primary school schoolchildren in thinking and language through logical techniques

Common logical actions	Levels	Content
- analysis of objects in order to distinguish the signs of the concept (essential and insignificant signs); - be able to implement	High	These students are able to be flexible, independent, and think independently. They consider emerging problems from different points of view, offer specific solutions, analyzing problems well. They are able to carry out operations of analysis, comparison, generalization, and accumulation, able to establish logical connections.

methods of analysis, comparison, generalization; - be able to carry out operations of analysis, comparison, and generalization of general concepts into a whole; - choice of bases and criteria for comparison, generalization, and classification of objects; - building a logical chain of thinking.	Medium	Schoolchildren can evaluate them strictly and correctly, without succumbing to the inspiring influence of other people's thoughts. Even if this is not always the case, such learners can see the strengths and weaknesses of statements and judgments and the errors they make in them. However, unfortunately, these students are not always able to consider problems from different points of view, establish many connections between phenomena, make assumptions and justify them. Able to analyze, compare, generalize, and establish patterns, but makes mistakes. It assumes that students make logical connections, but such tasks take more time to complete.
	Low	The low level of development of thinking and language of schoolchildren is characterized by the absence or very weak development of the thinking or speech skills that learners possess. These schoolchildren are not able to carefully weigh all the arguments in support and against their hypotheses and do not carry out their comprehensive verification. Every first statement that they come to their thoughts, they perceive as the truth. As a rule, they are not self-critical in their decisions, they are not independent. Analytical and synthetic activity is underdeveloped, making it difficult to generalize and identify patterns. Even partially owns the action of comparison. Establishing logical connections is difficult.

At the first level, at the lowest level, concrete objects act as an indicative basis for actions. The teacher can also use pie charts as visual examples of techniques and relationships. At the next level of abstraction, models of real objects are used, materialized with the help of tables, matrices, drawings, and charts, visually providing the necessary logical actions. At the third level, a verbal description of logical relationships is used without relying on visual samples. This level is the highest in terms of abstraction of didactic material. Logical thinking must be formed on the basis of various materials and started as early as possible. We were guided by the following methodological requirements for the selection of tasks for the development of logical thinking and speech in schoolchildren:

- The task should be aimed at developing the cognitive abilities of the schoolchild;
- Arouse interest and create conditions for independent search;
- The schoolchild must have a quality that develops the imagination.

One of the sources for the formation and development of logical thinking in primary schoolchildren in the process of primary education is the system of propaedeutic (explanatory, encouraging) exercises. However, these tasks become a tool for the development of logical thinking only when the mental activity of schoolchildren is correctly managed and controlled by the teacher in the process of their implementation (Hudson, 2015; Henderson and Rodriguez, 2008).

The methods of thinking used in teaching primary school children are closely interrelated. Whatever science reveals the essence of the objects under consideration and studies what laws they obey. Object recognition begins with *observing* them. After that, *the analysis and generalization* of the observed objects take place, based on which other actions are carried out. The analysis is not carried out without accumulation; in the process of thinking during the lesson, they are realized in unity and are considered as two sides of the cognition of reality. The uniqueness of analysis and accumulation is also manifested in other mental techniques, for example, in *comparison* and systematization. The comparison is not complete without analysis, *generalization, and abstraction*. In the process of cognition, the methods of thinking, in which analysis and generalization are their derivatives, pass to abstraction and generalization.

The teacher, before instructing the schoolchild to observe this or that object or phenomenon, introduces the main goal of this work and the plan for its implementation. The main objects to which attention will be drawn are indicated. In the course of assessment, the need to describe in words each identified feature - property is explained. For example, suppose that the schoolchild has set him/herself the main goal - to control the identification of characteristic signs of the spring period. He/she pursues his/her goal through the systematic and orderly observation of identity, which is

filled with signs of spring: sunrise, snowmelt, the outflow of water from year to year, mold on the ground, tree budding, flower pox, the arrival of birds, their nesting, hatching of chicks, etc. The systematic observation of schoolchildren for changes in the weather makes it possible to recognize the change of autumn, winter, spring, and summer seasons. The orderly conduct of observations makes it possible to recognize an object or phenomenon from different angles, to protect against randomness in perception. They feel different from each other. In addition, the systematic conduct of control contributes to a deeper recognition of the object to be accepted.

Teaching the classification of certain subjects according to the main features is also teaching schoolchildren logical thinking. It should be noted that the training was carried out according to the principle of easy to hard. For example, the teacher suggests the words lion, sheep, goat, tiger, cow, wolf, horse, bear, and camel and instructs them to classify them according to the main signs and properties of life. Schoolchildren are divided into two large groups, studying the behavior and life of these animals and beasts.

1. Domestic animals: sheep, goats, cows, camels, horses.
2. Field animals, predators: lion, tiger, wolf, bear.

If the teacher mixed words such as goose, chicken, duck, and turkey for them, then the schoolchildren would divide these words into three groups.

3. Birds: goose, duck, chicken, turkey.

As a result of the classification of these concepts, schoolchildren have the opportunity to deeply and qualitatively assimilate the essential features of the concept, highlight the ratio of generic and specific features and visually see the similarities and differences between the parts of the proposed concept that have arisen in the process of classification. Schoolchildren comprehend the specifics of each of the selected members of the concept. This will undoubtedly contribute to deeper acquisition of the materials of each subject.

1.1. Purpose of study

The implementation of a system of tasks for primary school children in many studies is considered a method for the formation of logical knowledge and skills, as well as a means of practical mastery of logical concepts, actions, and disclosure of their connections. To verify the above theses, we conducted an empirical study in the form of experimental work with primary school schoolchildren. The purpose of the study is to determine the main criteria for the developmental education of thought and language to primary school children and to assess the level of schoolchildren before and after the experimental work in the process of completing tasks using logical approaches.

2. Methods and techniques

2.1. Data collection method

Experimental work was carried out in mathematics lessons and was aimed at studying the system of development of logical thinking of schoolchildren using innovative strategies. The material of the empirical study was a collection of tasks on the development of thinking and language of primary school children through logical techniques.

2.2. Participants

The experimental study involved 76 schoolchildren (three groups of 25, 24, and 27 schoolchildren). At the same time, in order to verify the data obtained during the experimental work, a control group of 74 schoolchildren was created, in which teaching was not carried out according to

the new method. With the 3rd grade schoolchildren, a course was held aimed at developing the language and logical thinking of primary school children using logical techniques.

2.3. Procedure

During the experiment, the experimental groups trained according to the proposed method. Classes in the control group were conducted according to the traditional method. All research data were recorded in special tables and processed using a program for advanced, descriptive, and instructive analytics.

The methods of the empirical study are based on a systematic approach and include a group of general scientific methods (analysis, synthesis, deduction, induction); several additional methods were also used: analysis of the content of completed tasks, the method of pedagogical observation and statistical analysis. As an evaluation criterion, methods were chosen that are part of thinking: comparison, classification, and generalization. Each of the criteria was evaluated on a 10-point scale, where: 1-4-low level; 5-8-medium level; 9-10-high level of skill development.

The study of the attitude of primary school teachers to logical methods and the identification of their difficulties, as well as the experimental determination of the ability of the 3rd-grade primary school schoolchildren to formulate concepts, reason and draw conclusions is the goal of our experimental work.

Several important steps in practical experimental work are:

- constancy in time (i.e. beginning and end);

- rely on previously received forecasts;

- identification of subjects, objects, processes included in the process of formation of logical approaches and factors necessary for adaptation and constraining this process;

- to identify, justify the pedagogical support for the development of thought and language in primary schoolchildren with logical methods and determine the effectiveness of this process;

-development of the experiment program by its goals and objectives.

By the goals and objectives of our experimental work, 150 schoolchildren were taken into practical experimental work from the 3rd grade of primary school as experimental (76 schoolchildren) and control (74 schoolchildren) groups. The experimental work was carried out in three stages:

The first step is to define the experiment. Where is the preliminary examination (psychological and pedagogical diagnostics) according to the level of formation of the logical thinking of primary schoolchildren;

The second stage is a forming experiment. Conducting experimental studies on the application of logical approaches;

The third stage is the final experiment. Rechecking and comparing the formation of logical thinking skills of schoolchildren in the experimental group with data in the control group.

The results of tests received from primary school schoolchildren corresponded to the table below (Table 3).
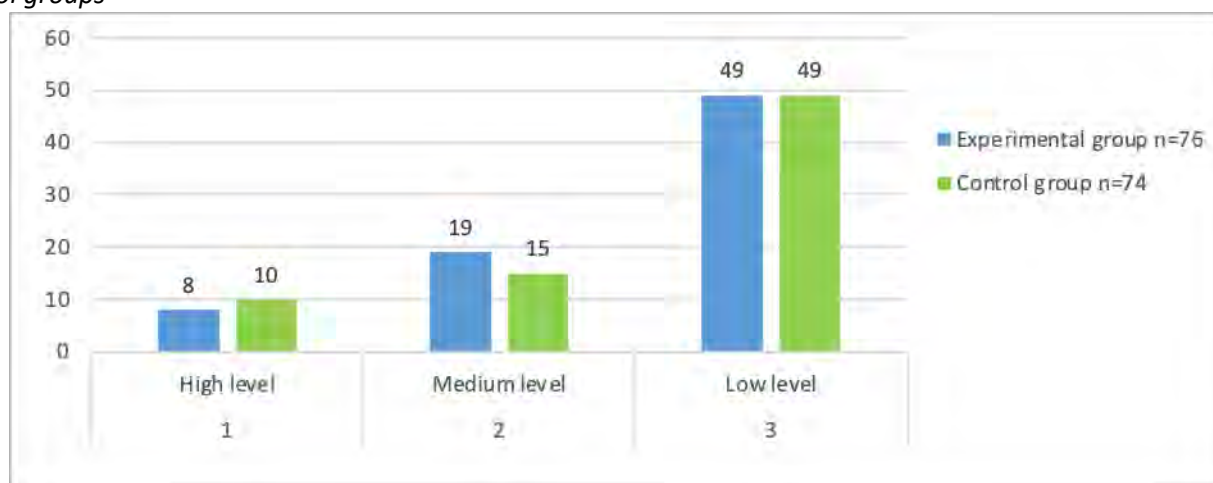
3. Results

Table 3

results of tasks completed by schoolchildren

No.	Assessment levels	Experimental group		Control group	
		n=76	100%	n=74	100%
1	High level	8	11%	10	14%
2	Medium level	19	25%	15	20%
3	Low level	49	64%	49	66%
	Total:	76	100%	74	100%

The results obtained made it possible to determine the level of mental development of primary school children and to identify the level of application of knowledge in mathematics and logical thinking techniques. An analysis of the results of the diagnostic task showed that logical mental operations, such as identifying and comparing logical patterns in schoolchildren, are exemplary and formed at a level below the medium (Fig. 1).

Figure 1
Diagram of the indicator of the result of the assignment by schoolchildren of the experimental and control groups

If we analyze the results obtained, then when completing the task, 8 schoolchildren of the experimental group (11%) answered at the high level, 19 schoolchildren (25%) were at the medium level, 49 schoolchildren (64%) were at the low level, and 10 schoolchildren from the control group (14%) - at the high level, 15 schoolchildren (20%) - at the medium level, 49 schoolchildren (66%) - at the low level. These indicators also indicate that, as in the previous tasks received, there is not much difference in the level of knowledge of schoolchildren in the control and experimental groups.

Based on the results obtained, we conclude that the logical thinking skills of schoolchildren in the first group were formed at a low level in the control group as well. At the same time, schoolchildren could not make elementary generalizations, compare abstract objects and classify their properties. We corrected this gap using a special methodical book and tasks developed by us, which significantly improved the skills of comparison, classification, and generalization of primary schoolchildren.

After a preliminary survey, classes were held in the first and second groups of primary school children, in which it was planned to use logical techniques. An example of an assignment developed in the course of experimental work on the development of speech and the formation of logical thinking in primary schoolchildren is given below.

Schoolchildren are provided with a text. According to the same text, special assignments have been compiled. 8 assignments for one text were developed. Schoolchildren first read the text. They understand the main idea in the text, find clear and fuzzy information, easily draw conclusions, form logical knowledge and thinking skills, formulate games using subject knowledge, group objects according to features, and also understand tasks of various forms (table, figure, diagram) and carries out work with them.

Consequently, in the process of completing assignments, schoolchildren develop language and logical thinking. It includes the following:

1. Read the text.

Elephants are the only animals from the group of ancient rhinos that have survived to this day. If earlier their species reached 40, today there are only three species: African Savannah elephants, African forest elephants, and Asian elephants. The body of an elephant is 6-8 meters, weight is 9 tons. They live 70-80 years. The main feature is a long, fleshy trunk attached to the upper lip. They use it in the hands of the people. Thus, it knows, smells the substance, and holds the wrapper. An elephant's trunk is capable of holding up to 7.5 liters of water at a time. The eyes of elephants do not see well, but they smell a smell that no other creature can smell. There are over 40,000 receptors in its trunk. The thickness of the skin in some parts of the elephant is 4-5 centimeters.

Elephants are sad, worried, and bored, help their brothers, make music, and draw. Despite their body size, they are mobile and move quickly, and their balance function is well developed. Like other large mammals, elephants tolerate cold better than heat. Spending the hottest part of the day in the shade, they constantly flap their ears to improve the cooling and heat transfer of their body. They love to swim in the water, pour water for themselves, and dive into the swamp and sand. These actions protect the skin from dryness, sunburn, and insect bites.

Elephants are animals that value family life. Their females always live with the family, and can only be separated when they die or when they are captured by humans. They walk in groups, among which there are from 6 to 12 elephants. And grandfather elephants are already separated from the family by the age of 12. An elephant baby that has just been born can stand up. Weight will be about 120 kg. At birth, the eyes are blind, it relies on their mother's trunk. Since the newborn elephant is not capable of survival, the mother and experienced members of the pack begin to train. The mother chooses several nannies for him and goes off to gather food itself to increase its milk. Elephants drink 100 liters of water a day and eat 300 kg of grass. Elephants sleep only 3 hours a day. In general, most of their lives are spent looking for food. That is, 20 hours a day are devoted to this. Elephants live in dense forests and open areas of Africa and Asia. Asian elephant habitat: South and Northeast India, Sri Lanka, Nepal, Bhutan, Bangladesh, Myanmar, Thailand, Laos, Cambodia, Vietnam, Southwest China, Malaysia (on the continent and the island of Borneo), Indonesia (Borneo, Sumatra) and the vicinity of Burney.

2. Above is information about elephants. The images below also give some information about the life of elephants.

Consider that you have a brother or sister younger than you. Let's say that he/she saw a photograph of these elephants. Let's say your brother/sister knows what kind of elephants are generally animals. Suppose that he/she does not know any other information about elephants and the life of elephants. So, convey information about elephants to a relative by showing these photos, namely:

- tell us what types of elephants exist and what they are called;
- give them information about their activities (for example, why do elephants bang their ears?);
- What area do they live in?

3. Make 3 questions on the text.
4. Calculate using the information in the text and fill in the table (Table 4)

Table 4
Calculation table

Number of elephants	1 elephant	2 elephants	3 elephants	4 elephants	5 elephants
Amount of drinking water per day					
Amount of grass eaten per day					

5. Logical task. An elephant sleeps 3 hours a day. How many hours a day do 7 such elephants sleep? Indicate the correct option.
A) 3 hours
At 7:00
C) 21 hours
D) 14 hours
E) 15 hours

6. Logical task. Three elephants are dragging 3 grass carts. Color of carts is various: red, green, and blue. The first carriage of the elephant is not red, and the third carriage of the elephant is not green. The cart of the second elephant is neither green nor red. What color is the carriage of the third elephant?
A) yellow
B) blue
C) white
D) green
E) red

7. Numbers are written on the cart pulled by elephants, and these numbers are arranged according to a certain pattern. The 1st elephant has 2, the 2nd elephant has 5, the 3rd elephant has 8, and the 4th elephant has 11. Find the number on the fifth elephant. In what order are they located?

8. Write a short story about any animal.

Table 5
Table for assessing these assignments

Assessment Criteria	Assignment №	Descriptor Schoolchild	Points
	1	Understands the main idea of the text	1
Work on the text	2	Finds correct information in text	1
	3	Reasons based on text	1
Drawing up a logical conclusion, comparison, grouping, calculation	4	Correctly finds and calculates information in the text	1
	5,6,7	Correctly finds the answer, reasoning and relying on logic, determining the pattern	3
Development of search, creative abilities	8	In the text, the thought is systematized, the semantic connection between sentences is established	3
Total score:			**10**

3.1. Assessment criteria:

High level - 9-10 points
Medium level - 5 - 8 points
Low level - 4 points and below

Along with this, the following tests were compiled. They are tasks aimed at comparing, generalizing, analyzing, and finding differences between objects and environmental phenomena. These assignments are similar to the topics of the lessons but have their specifics. We offer a sample below. Five words are given, four mean one common meaning, one does not match in meaning, and that is, you need to odd out one extra word.
Sample: a) a plate; b) a bowl; c) a table; d) a boiler; d) driving. The word that does not fit here is "driving".
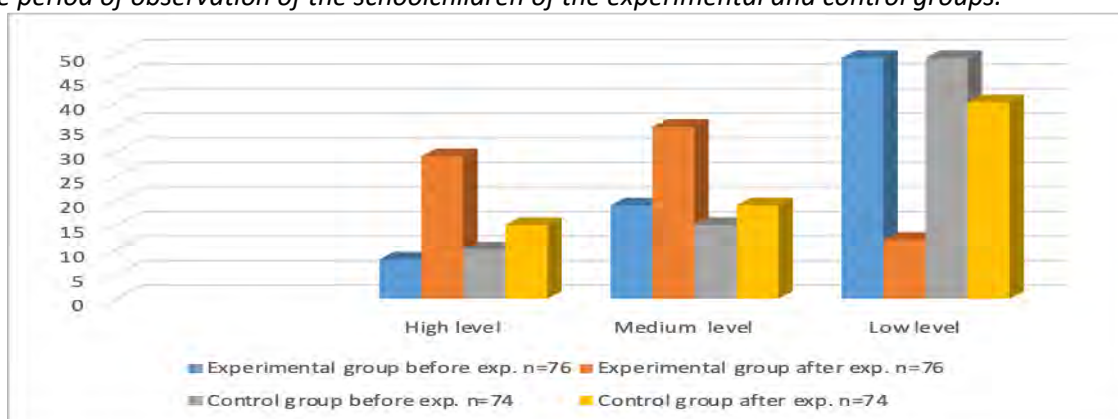1.a) walking, b) jumping, c) dancing, d) running, e) sitting.

2.a) straight; b) triangle; c) rectangle; d) square.

3.a) a fox; b) a map; c) a wolf; d) a bear; d) a tiger.

4. a) mathematics; b) a novel; c) natural science; d) Kazakh language;

e) physics.

5.a) an apple; b) a pear; c) a banana; d) a persimmon; d) a craftsman.

6.a) triangle; b) segment; c) length; d) square; e) circle.

7. a) Astana; b) Almaty; c) Shymkent; d) conclusion; e) Turkestan.

8. a) literature; b) science; c) mathematics; d) fine arts; e) drawing.

9. a) sugar; b) tea; c) heart; d) oil; d) jam.

10.a) description; b) comparison; c) characteristic; d) fairy tale.

After applying the "logical literacy" course organized by us and a specially designed set of assignments and exercises at the forming stage of the practical experiment, the results were as follows (Table 6):

Table 6

Results of the comparative performance of assignments by schoolchildren at the control stage

No.	Assessment levels	Experimental group		Control group	
		before exp. n=76	after exp. n=76	before exp. n=74	after exp. n=74
1	High level	8	29	10	15
2	Medium level	19	35	15	19
3	Low level	49	12	49	40
	Total:	76	76	74	74

Figure 2

Diagram of the indicator of the relative result of the fulfillment of assignments by the schoolchildren for the period of observation of the schoolchildren of the experimental and control groups.

4. Discussion

If we analyze the results obtained, then when completing the assignment, 29 schoolchildren of the experimental group (38%) were at a high level, 35 schoolchildren (46%) - at a medium level, 12 schoolchildren (16%) - at a low level, and 15 schoolchildren from the control group (20%) - at a high level, 19 schoolchildren (26%) - at a medium level, 40 schoolchildren (54%) - at a low level. Consequently, the quality of knowledge of schoolchildren in the experimental group who showed a high level increased by 27%, the quality of knowledge of schoolchildren who showed a medium level increased by 21%, and the quality of knowledge of schoolchildren who showed a low level decreased by 48%. As for the schoolchildren in the control group, the quality of knowledge of schoolchildren with a high level and the quality of knowledge of schoolchildren with a medium level increased by 6%, while the quality of knowledge of schoolchildren who showed a low level decreased by 12%. This indicator, in turn, indicates the effectiveness of the use of logical approaches in the learning process.

This is due to the fact that there is a big difference between the level and quality of knowledge of schoolchildren in the control group and the experimental group. Our results have been proven in a number of modern research, namely: in the works of Palamarchuk (1979), Yakimanskaya (1985), Nikolskaya (1978) that in the process of learning to master the main thing in the materials of the school curriculum, primary school children are allowed to use methods of analysis, control, comparison, classification.

Thus, the ability of primary school teachers to develop thinking and speech through logical approaches is proved in the course of systematically organized work on the basis of theoretical analysis, the basis of the developed program, and the methodology of the special course. Thus, in the course of the study, we proved that the effectiveness of logical approaches in teaching contributes to the development of thinking and speech skills in primary schoolchildren. The results obtained on the methodology of applying logical approaches in teaching confirm the works of Rakhimbek (1998), Zhapbarov (2015), Kurmanov (2004), and Stambekova et al., (2021).

5. Conclusion

During the experimental work, special attention was paid to the development of logical thinking and the development of speech in primary schoolchildren. The assignments are taken from the already developed collection of assignments for the formation of thinking and the development of schoolchildren's speech. After carrying out practical experimental work, the 3rd-grade schoolchildren got the opportunity to think logically in three aspects when performing the given exercises. In addition, when solving problems, reasoning, and analyzing, the schoolchildren observed a built-in logical chain of thinking. As a result, it was possible to increase the reflective activity of schoolchildren.

In the last lessons, the cycle of assignments gradually became more complicated. The goal was to assess how well the schoolchildren were able to think logically. At the same time, attempts were made to ensure subject-subject relations. In the course of the study, the development of logical thinking and the development of speech in primary schoolchildren was associated with a general improvement in their knowledge. If at the beginning of the study the level of mental skills, such as comparison, analysis, and generalization among primary school children, was low, then at the end of the study their level indicators increased significantly. Thus, the use of logical teaching methods in the learning process has demonstrated its effectiveness in the development of logical thinking and speech development in children of primary school age.

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