Article

Logical Thinking Methods and Classification in Preschool Children

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Abstract: This article analyzes the essence, methods and classification of logical thinking in preschool children. Logical thinking is important in developing a child's ability to understand the environment, solve problems and think independently. The article describes the methods that help to form the logical thinking of children, including analysis and synthesis, understanding of cause-and-effect relationships, mathematical and logical thinking, and methods of developing creative thinking. It also provides information about the types of logical thinking and their age-appropriate development stages. This research helps to improve pedagogical approaches aimed at developing children's thinking ability.

Keywords: Preschool Education, Logical Thinking, Development Of Thinking, Analysis and Synthesis, Causal Relationship, Comparison, Classification, Pedagogical Methods, Logical Exercises, Children's Thinking

1. Introduction

Mental education is understood as a system for developing the intellect, cognitive abilities, talents and abilities of a learner. Mental education of preschool children is the purposeful influence of adults on the development of children's active thinking. It includes providing children with knowledge about the world around them, systematizing it, arousing children's interest in knowledge, developing mental skills and abilities, and developing cognitive abilities. In order to properly organize mental education of preschool children, it is necessary to know the laws and capabilities of their mental development. In preschool age, mental development is observed at a higher rate than in other age periods. It is especially necessary to pay special attention to the mental development of children of the first age group. The results of modern research show that children up to two years old have a very large amount of cognitive activity. The child's mind develops rapidly, and by the age of three it is equal to eighty percent of the mental power of adults. This situation requires protecting the preschool child's mind from excessive stress.

Preschool children require early childhood education to develop logical thinking which acts as a foundation for their intellectual progress and problem-solving capabilities. Through logical thinking children learn to recognize patterns while connecting causes to their effects and they gain the ability to think independently. Children who develop logical thinking skills at a young age will be better prepared to face advanced problems encountered in school and everyday life since analytical thinking is now seen as crucial expertise. Young brains develop their mental processing skills more quickly in preschool years so it becomes essential to teach structured analytical activities that teach logical reasoning skills. The period from age two to age five features intense brain growth which educators and parents should use to develop cognitive flexibility together with improved

memory skills along with analytical abilities in children. Parents and educators should train children in logical development through repetitive practice and intellectual exercises which help develop this mental ability.

Prevention of logical thinking in preschool children requires structured educational games with elements that train their pattern recognition skills as well as classification abilities and sequencing competences. Childlike sorting exercises that require organizing objects according to size or color help children learn about the basic logic principle of similarities and distinctions. When children engage with puzzle activities and memory tasks and classification exercises they develop their expertise in identifying concepts and their relationships to different objects. These educational exercises commemorate both entertainment value and critical importance for problem-solving abilities development. Children's logical development receives support through storytelling and role-playing exercises because these activities let children make predictions about results while understanding character drives and constructing meaningful narratives. Daily routines that integrate these activities help educators build a stimulating educational space which develops an interest in learning and critical thinking abilities.

Technology proves essential for developing logical thinking ability in students. Educational applications that run digitally now give children access to engaging adaptive logical challenges for developing their reasoning abilities. Kids acquire cognitive development through digital games which combine sequencing assignments while demanding mathematical evaluations and problem-solving tasks and let them practice their logical abilities across different situations. Students learn better when exposed to augmented reality (AR) and virtual reality (VR) technologies since these interactive environments make them solve problems by analyzing situations to make decisions. The benefits technology delivers must be balanced against direct physical object engagement and social group work because they develop real-world learning. The cognitive development of children becomes complete through using digital learning methods alongside traditional teaching methods.

Parents along with educators must keep a central position in developing logical thinking regardless of scheduled exercises and digital learning approaches. Learning environments provide optimal conditions when they facilitate pupils to explore while asking questions and demonstrating curiosity. Parents together with teachers need to hold active discussions with children where they ask them comprehensive questions which force the students to reveal their thinking methods. The development of children's cognitive abilities improves through performing routine tasks that require object comparison and counting general items and problem-solving scenarios. The act of speaking about decision-making logic enables children to build better critical thinking skills along with clear communication abilities. Children develop proficient analytical reasoning skills when logical thinking exercises become a part of school activities and home-based learning which enables them to succeed in their academic and personal lives.

2. Materials and Methods

In modern pedagogical thought, new points of view have emerged on the formation of the logical aspects of thinking. Some scientists, for example, Yu.V. Trofimenko, Puzina and K.V. Shevelev, argue that preschool education is the most important period for the initial formation of intellectual development in children. However, as other scientists, L.Yu. Bondareva, M.A. Gabova, E.V. Mikheeva, emphasize, logical operations and the main forms of logical thinking are formed in preschool age.

Research by M.V. Karpova and L.V. Voronina shows that the most important condition for the formation of logical thinking in preschool children is to take into account the mental characteristics of children. In preschool educational organizations, the mental development of children is incomplete, and their pedagogical and game attention

contributes to the development of visual-figurative thinking, the formation of logical thinking and symbolic functions. Most importantly, in the development of logical thinking, the ability of children to independently find solutions plays a key role. In this, according to (G. Liu), the ability of children to control and check their correct actions is of great importance.

Currently, existing programs cannot cover all the necessary and accumulated experience of children. Therefore, it is necessary to improve the educational process, which will help children independently carry out search activities, obtain the necessary information and apply it in life. As noted by A.Yu. Nekleenova, it is very important to support children's independent development in areas of knowledge.

According to L.V. Voronina, the style of logical thinking is considered as a system that is constantly replenished and relatively changing with external factors. It should be noted that each experience is mastered in accordance with the personality, and there are several styles of a complex stylistic mental structure. This is sometimes called "intellectual spinelessness". Scientists, for example, in the studies of R. Bramson and A. Harrison, distinguish between styles and the number of ways of thinking, but these differences often reach dozens of ways.

3. Results

Table 1. The classification of thinking styles is given by E.V. Mikheeva.

Synthetic style	The synthetic style is aimed at creating new, original and unified thoughts. This style combines opposing ideas, visions and spiritual experiences of understanding. The motto of synthesizers is: "What if..." Synthesizers strive to expand possibilities, create generalized concepts, combine different approaches and try to reconcile contradictions.
Idealistic style	The idealistic style manifests itself in solving problems based on intuition and global assumptions, without detailed analysis. Idealists are characterized by an interest in human values, moral issues, goals, and needs. They make decisions based on subjective and social factors.
Pragmatic style	The pragmatic style relies on direct personal experience and makes use of materials quickly. In this style, the goal is to get tangible results as quickly as possible, even under limited circumstances. The motto of pragmatists is: "Something works" or "That's good, whatever works."
Analytical style	The analytical method is based on systematic, comprehensive, and objective criteria. It approaches problems logically, methodically, and thoroughly, paying attention to details, and seeking solutions.
Real style	The realist style is focused on recognizing only facts and accepting only what is "real." This style aims to understand things that can be experienced and actually exist through personal experience, such as seeing, hearing, or touching.

E.V. Mikheeva in the article describes five main styles of mental activity and their combinations. She recognizes the equivalence of thinking styles as the most important distinguishing feature. Each style has its own strengths and weaknesses, and there should be no distinction between them as "best" or "worst", since these approaches should not be evaluated based on the general level of intelligence. An individual style of mental activity affects behavior and ways of solving problems, and also characterizes a specific type of activity and thinking personality. Therefore, it is necessary to work with purposeful approaches and styles in mental activity, as described by M.A. Kholodnoy (Table 2).

Table 2. Approaches and Styles in Mental Activity According to M.A. Kholodnoy.

Synthesizers	Synthesizers are often submissive, openly skeptical, sarcastic, and refuse to acknowledge such actions when displaying specific behaviors. They tend to accept contradiction, especially when they are opposed to popular opinion, show disagreement, and often show hesitation when expressing their opinions.
Idealists	Idealists never give in to practicality and boldly express themselves. They feel comfortable even in an open debate, not to mention a conflict. In critical situations, all their actions are subordinate to one goal: to prevent a quarrel. Idealists study the issues being discussed more at the level of people and their emotions, motives.
Analysts	Analysts focus on a logical approach rather than introducing love or emotions into the conversation. For them, conversations that are considered "unconventional" or "philosophical" are useless. Analysts always prefer a thorough, serious, and deliberate approach; they try to approach any issue more clearly, logically.
Pragmatists	Pragmatists are open, friendly, and active people, and they are less impressionable and tense than idealists. They communicate easily, are active, courageous, and open to new experiences.
Realists	Realists appear to be ordinary people - open, simple, and honest in their opinions. They are strong, independent, and assertive, sometimes aggressive. They express their thoughts quickly and often stand out from the crowd.

Logical development is associated with ontogenetic periods, the formation of logical operations occurs gradually and develops according to the principle of complexity of this process. Logical thinking is understood as the process of human activity, working with clear and understandable concepts. The process of activity of this type of thinking is important, since it is necessary to apply previously acquired knowledge, draw conclusions and reveal new experiences. People resort to logical activity because they are looking for answers to problems or new solutions, arguments for making decisions. Logical thinking is a particularly important feature that allows them to find relationships between objects, generalize and draw conclusions.

The main feature of the logical development of preschool children is the acquisition of figurative forms of cognition (perception, figurative thinking, imagination). The cognitive processes that develop in children are reflected in a variety of activities. Through the development of imagination in children, they can visualize the scene of activity, plan the work they need to do, and determine what is required of them. The knowledge that children acquire not only expands their thinking, but also determines their attitude to people, their actions, nature, art, etc. We will consider these tasks below in connection with preschool education. The main task of intellectual education of children from an early age is to increase their cognitive activity. By increasing their logical activity, children learn about the environment around them. Children understand the environment in the process of play, work, walks, classes, and communication with adults and peers. Logical activity is carried out in the form of perception and thinking. Through perception, children understand the external properties of objects (color, shape, size, etc.). By reflecting these properties, an image of objects is created in the mind. Children's thinking reflects the internal, hidden properties of objects, the causal relationship between objects and events.

The result of thinking is expressed with the help of words. The result of children's thinking is manifested in the form of a thought or question. Perception is formed from the first months of children's lives, and the development of thinking begins at the age of two.

The basis of thinking is perception, which is used to understand sensory experience more deeply. At preschool age, perception helps to think in order to analyze, compare, generalize, and draw conclusions.

According to the state educational standards of preschool education and upbringing, preschool education is a holistic process aimed at comprehensive development, taking into account the interests, talents, individual, mental and physical characteristics, and cultural needs of preschool children, and providing for the formation of moral norms in the child, the acquisition of life and social experience.

The development of logical thinking within preschool children shows that a complete methodology needs various educational methods along with structured activities and interactive learning approaches according to the results and discussions. The study's thinking styles classification demonstrates why educators must understand distinct cognitive processes of each child while creating appropriate adaptive educational strategies. Educators gain the ability to develop specific intervention strategies for different learning needs by properly identifying synthetic, idealistic, pragmatic, analytical and realist thinking styles. The cognitive styles shape a student's problem-solving abilities as well as their decision-making processes and ability to think flexibly and thus require educational teachers to use different instructional approaches for logical development support. The comprehensive school curriculum should integrate analytical exercises alongside both idealistic storytelling and hands-on activities together with real-word problems for realists. Thorough teaching approaches consisting of diverse methods guarantee academic support delivery for logical reasoning development among all children regardless of their cognitive style orientations.

Experiential learning together with cognitive style adaptation form essential elements for logical development. Active environmental engagement leads children to learn effectively as research shows which makes interactive and manipulative-based learning essential. The stimulation of logical reasoning occurs through activities that include sequencing exercises along with classification games and cause-and-effect experiments. Children develop the ability to apply abstract thinking abilities to real-life instances when teachers include logical principle applications such as object sorting during clean-up time and following multi-step directions and predicting scientific results. Preschoolers strengthen their logical abilities through daily encounters with mathematical concepts because they develop skills in recognizing patterns over numeracy aspects and spatial orientation. Cognitive development theories support the model since actual experience becomes essential to enhance children's abstract thinking abilities.

The research outcomes underline the requirement to build metacognitive awareness in students who are young so they can reflect on their thinking processes as well as problem-solving approaches. The development of higher-order thinking requires children to express their reasoning and justify their choices while evaluating different solution options. Educational and parental guidance provides students with questions that help them develop critical thinking about their choices. Children develop their thinking skills when educators ask them to explain their rationale behind selecting puzzle pieces. Students should investigate what results occur when we shift the sequence of these events. fosters analytical thinking and self-awareness. Children participating in peer-based learning activities develop their cognitive adaptability and social learning abilities when they observe different reasoning approaches while working on collaborative problem-solving tasks and discussing with their peers.

4. Discussion

Educational programs alongside focused exercises maintain their value for logical development which requires an equally important supportive environment to enhance learning effectiveness. The beneficial environment of preschool enables students to tackle

challenges by encouraging them to learn from mistakes thus building their resilience alongside growth-oriented thinking. Children build stronger logical thinking confidence through environments that support experimentation together with mistakes and reasoning abilities strengthening. The teaching method should focus on inspiration instead of correction when advancing children through their own self-discovery process rather than through answers. The combination of planned educational content with self-reflection moments and hands-on activities and supportive classroom environments produces successful logical thinking abilities in preschool-aged children. The outcomes of these educational methods support children to handle advanced intellectual challenges that will matter both inside and outside the classroom.

The following methods, techniques, and games can be used to improve mental and logical development. Children's dominoes: If you play dominoes with your child, depicting fairy tale characters, and sometimes lose to them, the child will play with great pleasure. During the game, he will develop mentally. You can also make children's dominoes yourself. During the game, a 3-year-old child develops initial generalizations, which helps the child solve simple problems. Memorizing poems: To develop the child's memory, memorize one small poem every day. The next day, it is advisable to recall the previous one and memorize a new one. Games can be played using various objects. For example, exercises with clamps and counting sticks; exercises with a handkerchief, a ball of thread, paper, a magic bag, threading shoelaces, mosaics, constructors, paper clips, toothpicks, and matches.

5. Conclusion

In conclusion, it should be noted that the development of logical thinking in preschool children is an important process that lays the foundation for their future educational process and ability to solve life problems. Children can develop logical thinking using methods such as comparison, analysis, synthesis, and understanding cause-and-effect relationships. Educators and parents need to guide children in this process and teach them to think. Human mental activity is a large number of diverse systems of general and special mental actions. The formation of a wide range of mental actions used in solving many tasks is of great importance. Such actions include analysis, comparison, and generalization. The mastery of both general and special mental actions by people ensures the development of mental activity and independence. The flexibility of mental activity helps to form the ability to perceive phenomena in terms of various connections and relationships. Early childhood education relies heavily on logical thinking development since it controls both cognitive performance and problem-solving aptitude for young students. Educators can successfully teach children analytical reasoning through structured exercises combined with experiential learning and diverse teaching approaches. Teaching strategies need to recognize varied thinking styles because an appropriate adaptation of teaching methods helps support cognitive diversity according to the study. Meaningful cognitive self-awareness grows when students work together on their learning while being guided through questioning procedures to bolster their logical thinking skills. A motivating learning space stimulates students to become more inquisitive along with developing resilience and thinking independently. The implementation of enhanced teaching practices alongside exciting education activities throughout preschool education will create robust academic backgrounds which enables children to logically understand problems with self-assurance.

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