

Neuropedagogical Methods

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Annotation: This article examines mnemonic boards and their neuro-pedagogical foundations, advantages, impact on memory enhancement, and their role in the educational process. It analyzes how mnemonic boards, as a neuro-pedagogical tool, support students' cognitive processes, optimize the processing and storage of information in the brain, and contribute to the effective application of students' cognitive competencies, acquisition of new knowledge and skills, and problem-solving. These characteristics are taken into account in the educational process, and the results of applying various educational methods, such as adaptive learning, differentiated instruction, project-based learning, and group work, are explored, which promote increased student engagement in the educational process.

Keywords: cognitive, mnemonics, neuropedagogy, teaching methods, reading efficiency, visualization, students, color cards.

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How to cite this article: Sidiqova YS. Neuropedagogical Methods. SDES-IJIR; 2025; 6-2: 1070-1075

Submitted: 25 –April- 2025; **Accepted:** 03-May-2025; **Published:** 08-May-2025

Introduction:

As we know, competence, as a combination of knowledge, skills, abilities, and values, is essential in shaping cognitive characteristics in students. A student's cognitive competence refers to their ability to effectively apply knowledge and skills in practice, acquire new information, think critically, and solve problems. This competence is of paramount importance in today's education system as a tool that shapes a student's ability to manage, analyze, synthesize, and evaluate the thinking process. Developing cognitive competence consists of skills such as navigating problem situations, finding solutions in new situations, and applying learned knowledge in various contexts. Cognitive research shows that the brain processes visual, audio, and kinesthetic information differently. Therefore, providing knowledge through interactive tools in the learning process – videos, pictures, infographics, audio materials, and real-life examples – yields effective results.

Materials & Methods:

The scientific-theoretical and pedagogical foundations for developing students' speech in our country have been explored in the research of A.Narmanov, F.R.Qodirova, R.M.Qodirova, G.Normatova, L.Muxtorova, M.E.Akhmadjonova, D.B.Mamatqulova; the didactic foundations for shaping cognitive activity in the research of B.R.Adizov, R.A.Mavlonova, R.Safarova, M.G.Davletshin, R.Ibragimov, X.P.Nazarova, T.N.Najmitdinova. In the Commonwealth of Independent States (CIS) countries, the nomination of children's speech, comparative analysis of them, aspects of the establishment of motivational reflections in children's speech have been studied in the scientific research of A.K.Vaganova, N.M.Goleva, A.V.Nikolskaya,

E.M.Razbayeva, YE.I.Tixeyeva, G.N.Pivneva, S.V.Krasnoshekova, O.S.Kolyasnikova, O.V.Shabalina, R.M.Aliyev. Among foreign scientists, issues such as the variable development of general secondary education, the formation of students' specific competencies related to speech, the importance of oral creativity patterns in developing students' expressive speech, the relationship between creative thinking and folk oral poetic creativity have been highlighted in the research of Dell Hymes, Naom Chomsky, U.S.Venger, H.Niyemi, A.Toom, A.Kallioniyemi, Jakku-Sixvonen, G.Sukerman. These mnemonic tables and reports, conference materials, internet publications, and journal data devoted to research on neuropedagogical approaches in shaping students' cognitive skills in the learning process were studied, and methods such as comparison, analysis, critical thinking, and generalization were applied.

Results And Discussion:

The importance of developing students' learning abilities by studying brain activity and cognitive processes is that these approaches allow for personalizing the learning process, strengthening memory and attention, and developing communication and creative thinking. By improving neuroplasticity, multimodal learning, the emotional environment, and strengthening motivation, the learning process can be organized more effectively. Therefore, the use of cognitive psychology and neuropedagogy achievements in the modern education system serves as a key tool not only for increasing students' intellectual potential but also for developing their independent thinking and communication skills.

The modern education system has adopted a student-centered approach as a core concept, which requires taking into account the individual cognitive characteristics of each student. Cognitive processes in the human brain are different for each individual, so it is important to adapt teaching methods to individual cognitive characteristics. Research in neuropedagogy and cognitive psychology shows that when an individualized approach is used in the learning process, students' learning efficiency can increase, their memory can be strengthened, and their motivation level can be raised [1, p. 56-64].

Each student's cognitive abilities are formed differently, and their cognitive processes differ in information processing speed, attention span, memory capacity, thinking methods, and learning style. Organizing the educational process taking these into account makes it possible to increase students' learning efficiency.

Students have different methods for receiving and processing information: 1) visual learners - best receive information through visual sources (diagrams, graphs, pictures); 2) auditory learners - video lessons, audio materials, and discussions have an effective impact on students who learn through listening; 3) kinesthetic learners - experiments, laboratory work, and movement exercises are the most effective method for individuals who learn best through practice [2, p. 87-91].

It is important to take into account the types of memory of students in the learning process. Short-term and long-term memory are related to the hippocampus structure of the human brain and play an important role in memorizing and processing information. Students with strong memory quickly memorize information, but they may have difficulty establishing connections between data. Students with weaker memory achieve better results with repeated learning and visual aids. Therefore, in the educational process, repeated exercises, associations, and memory-enhancing methods (mnemonics, mind maps) should be widely used.

Human thinking can vary: 1) logical-analytical thinking - thinking based on facts and evidence (mathematics, logical analysis work); 2) creative thinking - the ability to develop new ideas, original approaches (fields of art, literature, design); 3) critical thinking - the ability to analyze, compare, and evaluate information (scientific research activities, essay writing).

It is required to take these features into account and use various teaching methods in the educational process. An individual approach involves organizing the educational process taking into account the personal cognitive characteristics of students. The following methods can be effectively used in this process: 1) adaptive learning - using resources adapted to students' personal learning style with the help of digital technologies; 2) differentiated instruction - giving each student tasks according to their knowledge level and individual characteristics; 3) project-based learning - students conduct independent research according to

their intellectual characteristics; 4) group work method - teaching students to learn in cooperation with each other, increasing their problem-solving skills.

Neuropedagogy is one of the most important areas that promotes an individual approach. Modern neurobiology research proves the benefits of adapting the educational process to personal cognitive characteristics. The use of methods that actively form neuronal connections in the brain during the learning process ensures that students learn knowledge well. In addition, an individual approach based on neuropedagogy takes into account not only cognitive but also emotional and motivational factors. Scientific research has shown that a student's emotional state and motivation affect their level of knowledge acquisition. Therefore, creating a positive emotional environment in the learning process, giving assignments directed at the student's personal interests, and strengthening motivation is one of the main goals of an individual approach.

In the modern education system, one of the important tasks is to increase students' interest in knowledge and encourage their desire to learn independently. In this process, neuropedagogical approaches are of great importance in shaping and maintaining learning motivation. Neuropedagogy aims to improve the education system based on the cognitive and emotional processes of the human brain. Scientific research shows that when students are highly motivated, their ability to concentrate increases, memory is strengthened, and the ability to retain knowledge for a long time increases [3, p. 66-68].

Motivation is one of the key factors in the educational process. It manifests in two forms: 1) intrinsic motivation - students' personal interest in acquiring knowledge, that is, a natural interest in a particular subject or activity; 2) extrinsic motivation - stimulating through rewards, praise, or a system of punishment.

Neuropedagogy studies the physiological and neurobiological foundations of motivation and determines how it can be encouraged. Scientific research has shown that a neurotransmitter called dopamine plays an important role in the motivation process. Dopamine is associated with the reward system in the brain and evokes feelings of excitement and pleasure during the learning process. If interesting methods are used in the educational process, students will feel the release of dopamine, increasing their interest in reading.

During our research, neuropedagogical approaches and methods for increasing learning motivation were identified. We will consider them below.

1. Creating an emotional and positive learning environment. Scientific research shows that in a state of stress, the amygdala part of the brain intensifies activity, which can slow down cognitive processes and reduce motivation. Therefore, it is important to create a positive emotional environment in the educational process. Providing psychological support to students, teaching them not to be afraid of making mistakes, and using methods of praise help to increase motivation.
2. Using advanced pedagogical technologies. Neuropedagogy encourages the introduction of multimedia, interactive technologies, virtual reality, and gamification elements in the educational process. For example, knowledge given using electronic learning platforms, audio and video materials is better received in the brain and stored longer in memory [4, p. 52-62].
3. Increasing motivation with multimodality. Using several sensory channels simultaneously in the educational process helps to increase motivation. For example, lessons given using visual information (graphs, diagrams), audio materials, and practical exercises involve students more actively. According to scientific research, the multimodality method strengthens neuronal connections in the brain and helps to consolidate knowledge [5, p. 93-99].
4. Using gamification and game methods. Game elements play an important role in strengthening motivation. For example, organizing debates and quizzes in lessons, introducing personal achievements and reward systems increase the level of dopamine in students and make the process of learning knowledge enjoyable. To use the gamification method effectively, it is necessary to provide students with structured goals, reward systems, and interactive problems that encourage them.
5. Social learning and group work. The human brain works more actively in a social environment, so

teamwork is one of the important factors in increasing motivation. Using team projects, discussions, and social learning methods increases students' interest in knowledge.

6. **Problem-Based Learning.** Teaching students to analyze real-life problems and find solutions to them is one of the effective ways to increase motivation. Problematic situations stimulate the active work of the brain, which increases the student's interest in knowledge.

Neuropedagogy offers effective mechanisms for shaping and maintaining learning motivation. Taking into account the importance of neurotransmitters such as dopamine in the motivation process, the educational process should be organized in such a way that it increases students' enthusiasm for learning. Creating a positive learning environment, using multimodal learning methods, introducing gamification, and strengthening social learning processes strengthen students' interest in education. Therefore, the importance of neuropedagogical approaches in the modern educational process is increasing, and the learning process can become more interesting and effective by using them effectively. The development of the science of neuropedagogy is making a great contribution to improving students' cognitive abilities in the educational process. In particular, developing key cognitive processes such as memory, attention, and thinking is crucial in increasing the effectiveness of the learning process. Scientific research has shown that neuronal connections in the human brain are strengthened during cognitive processes, which is an important factor in improving memory, concentrating attention, and developing thinking.

Memory is one of the most important cognitive processes in the educational process, and it is divided into long-term and short-term memory forms. According to neuropedagogy, the hippocampus structure in the brain is active for effective storage of information in long-term memory. Scientific research has shown that the following methods are effective for strengthening memory:

1. **Spaced Repetition** - repeating information at certain intervals helps to keep it firmly in memory.
2. **Association method** - connecting new information with existing knowledge makes it easier for them to move into long-term memory.
3. **Mnemonics** - techniques for memorizing information in the brain through various symbols, short stories, and schemes are effective in strengthening memory.
4. **Using visual and audio-visual materials** - information received through visual and auditory channels is processed faster in the brain and stored longer in memory.

The study identified methods that are effective in developing thinking. These are: 1) Problem-Based Learning - putting students in problematic situations and encouraging them to find solutions develops thinking; 2) critical thinking exercises - exercises for analyzing, comparing, and understanding cause-and-effect relationships strengthen thinking; 3) creative approaches - assembling mosaics, writing essays, solving complex problems in various ways activate thinking; 4) Dialogue and communication-based education - expressing ideas and entering into debates is one of the important factors in developing thinking.

Neuropedagogy deals with the development of teaching and learning methods in the educational process, taking into account neurobiological and psychological factors in the brain. Today, various pedagogical and psychological methods are used to make education more effective. One of them is mnemonic tables. Mnemonic tables are mainly a tool used to help students effectively memorize and transmit information. This tool helps students concentrate their attention, develop their imagination, and facilitate the assimilation of material. Mnemonic tables as a pedagogical tool are based on brain and memory processes. Mnemonic tables not only help to improve memory but also to achieve effective results in general education. They can be used in a variety of topics, such as history, mathematics, language learning, and other fields. Mnemonic tables are very effective as a neuropedagogical tool for students, helping students improve their learning and memorization of information in the learning process. Neuropedagogy develops teaching methods, taking into account the brains and development of children. Mnemonic tables, on the other hand, activate the brain activity of children, making the educational process more effective.

The neuropedagogical effect of mnemonic tables on a child is manifested in the following aspects:

Mnemonic tables help students' cognitive development. Students may have difficulty memorizing information. Mnemonic tables facilitate their mind, making it easier to understand and retain information. Tables and diagrams help students see and organize information, which stimulates the systematic functioning of the brain. Mnemonic tables are compiled by the teacher, after which students are involved in this process. Mnemonics not only helps to develop memory, but also to strengthen the fantasy, helps students to visualize images. Using mnemonic tables in working with students is recommended in the following cases:

- to increase student's vocabulary;
- in teaching how to compose and tell a story;
- in retelling fiction;
- in saying and finding riddles;
- in memorizing poems.

Based on the principles of operation, mnemonic tables can be presented in visual, auditory, and kinesthetic forms. These methods help to activate various aspects of brain activity [6, p. 8]. Mnemonic tables are based on the following neuropedagogical principles:

Visual learning: Through mnemonic tables, the student has the opportunity to remember the material by seeing it. Such tools have a positive effect not only on short-term memory for students, but also on long-term memory. Seeing and referring to tables or diagrams helps students remember information for a long time. Using images and diagrams improves brain function and increases reading efficiency. Children learn visual materials well. Mnemonic tables present information in pictorial form, which makes it easier for children to remember. For example, colorful tables or diagrams allow children to quickly memorize information. Visual areas of the brain play a strong role in remembering and structuring information. Pictures and diagrams help to memorize information better, because visual material is more interesting and more preserved. Using pictures or images is a very effective and convenient method among mnemonic table methods. Visual materials not only make it easier to memorize information, but also increase the student's interest and help to concentrate in the educational process. From a neuropedagogical point of view, learning through visual parts of the brain, in particular, pictures and images, is very effective in storing and remembering information [7, p. 67].

"The neuropedagogical characteristics of mnemonic tables may include:

When information is presented in an organized and displayed manner, students can understand topics more clearly and remember them better. In reinforcing memory, mnemonic tables also facilitate comprehension by segmenting information. They are beneficial in studying complex or large amounts of information, improving reading and understanding.

Mnemonic tables support cognitive abilities in students, helping to develop logical reasoning and comparison skills. Through this method, it is possible to create connections among students and strengthen systematic thinking. Mnemonic tables facilitate a short and effective learning process. Children learn complex information in a concise and simple form, which helps them focus their attention and makes the learning process more efficient [9.B.73]. Developing speech and thinking skills with mnemonic tables also plays an important role in the social development of children. They help children feel successful in the learning process. When learning and memorizing new information becomes easier, children gain confidence in themselves. This also positively affects their social and emotional development. Qualities such as independence, high self-esteem, the ability to express critical thinking, the ability to behave in a team, and benevolence towards friends are of great importance in the formation of a student's personality."

Overall, mnemonic tables are an engaging and effective tool in the learning process for children, greatly contributing to their neuropedagogical development. This method allows children to assimilate their knowledge more deeply and makes the learning process comfortable and engaging.

Mnemonic tables affect different parts of the brain, helping to select methods that match the student's learning

style. For example, some students learn better through visual images, while others learn through listening or movement. Neuropedagogy scientifically studies these different learning styles, allowing mnemonic tables to be tailored to their needs. Mnemonic tables can be applied in various ways, and each of them is based on neuropedagogical approaches [10.B.178]. Below, I provide information about some common mnemonic table variations and their neuropedagogical foundations: Creating acronyms or abbreviations, using the initial letters of words to memorize a specific sequence or list of information.

Conclusions

In conclusion, it can be said that applying mnemonic tables as a neuropedagogical tool can be appropriate and effective. Neuropedagogy is based on understanding how the brain works in the learning process of students, and it also strives to adapt teaching methods and strategies to the natural functioning of the brain. Mnemonic tables are one such method, helping to improve the brain's ability to store and recall information. When concluding by noting the importance of neuropedagogical approaches in shaping students' cognitive skills in the learning process, it should be considered that cognitive abilities are formed differently in each student. Given the differences in their cognitive processes, memory capabilities, speech, thinking, attention stability, and concentration levels, organizing educational processes while taking these differences into account is becoming an important factor in achieving effectiveness in education, and is evolving into a necessity for progress.

Financial support and sponsorship: Nil

Conflicts of interests: There is no conflict of interest

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