

# Neurodidactics in foreign languages teaching (for example in Russian as a foreign language)

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## ABSTRACT

Foreign language teaching provides many opportunities to integrate neurodidactic principles. This approach allows educators to organize different lessons that also integrate the principles of individualization and differentiation that are not only offered by neurodidactic researchers. Due to the progress in neurobiology and brain studies in recent decades, a new interdisciplinary field of research called neurodidactics has been created. Today, there are various concepts and ideas in the field of neurodidactics. Some methods bring together the principles of neurodidactic.. However, there are no specific ideas for practical lessons in the classroom and evaluation of these methods. The authors of this article present the results of some foreign researchers who have shown significant results in applying neurodidactic principles in foreign language teaching.

**Keywords:** neurodidactics, Foreign languages teaching methods, innovative methods of teaching foreign languages.

## Introduction

Today, there is an increasing interest in foreign language teaching around the world <sup>[1]</sup>. Many language schools offer courses aimed at achieving excellent foreign language skills in the shortest possible time. Teachers enabled students learning by using different methods to help them improve their thinking skills <sup>[2-4]</sup>. The traditional "teacher — textbook — learner" teaching method is gradually being replaced by some newer methods, such as:

- Alpha level learning— by stimulating brain waves and the brain through light and sound tones, thus improving learning and memorizing abilities

- Callan method (Introduced by English founder Robin Callan) — teaching English through a question and answer-based conversation
- Genki method (Japanese word for "fun", "lively", "energetic") is a game-based learning method
- E-learning — the use of information technology
- Lozanov method — listening to music in the background with an object in theta state (suggestology)
- Direct method — focuses on narrative
- Distance learning — based on online instructions, strong motivation of the learner is required
- Inlingua method, LCF clubs, Helen Doron method, Berlitz method <sup>[5]</sup>.

In the 1980s, another interdisciplinary activity was recorded in education field, which became known as neurodidactics. This term was first used in the work of Gerhard Preib, Professor of "mathematical didactics" at the College of Freiburg Pedagogical. Since 1988, neurodidactics has been considered a relatively new scientific interdisciplinary field of research that combines brain and didactic research <sup>[5]</sup>. Neurodidactics are also closely related to neurobiology, science of education, didactics, and psychology.

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Recent studies in neurodidactics show that there is no single and unique method of learning and teaching based on the principles of neurodidactic <sup>[6-9]</sup>. Therefore, there is a significant number of definitions of the term "neurodidactics" in the scientific literature.

## Literature review

The most comprehensive definition, is as follows: "Neurodidactics is the art of organizing and improving education based on knowledge of brain structure and its functions, sensory preferences, differences in brain hemispheres, learning styles, reactions to stressful situations, and different types of memory. The neurodidactic approach combines and connects different aspects of traditional learning from new perspectives. It focuses on education, learner personality, and motivation to learn. It is the science in the sense of organizing the educational process using the latest knowledge about the human brain" <sup>[7]</sup>.

The neurodidactic approach uses neurobiological and psychological knowledge in education and provides information about what happens in the brain and how the individual is learning <sup>[5]</sup>.

According to W. Lehmann's definition, "neurodidactics is a combination of didactic or, ultimately, pedagogical and psychological concepts with contemporary knowledge of neurobiology, and in particular with later brain research" <sup>[10]</sup>.

While neuroscience in didactics was not sufficiently studied in the past, neurobiological knowledge plays an important role in education in the 21st century. Neuropedagogy and neurodidactics are becoming increasingly popular, and many researchers consider such methods to be revolutionary in education, and prefer to organize the learning process using the latest knowledge of the human brain.

Neurophysiological discoveries have been the subject of many neurodidactic works, and areas related to knowledge in the field of brain research are also widely used in language teaching. Neurobiological discoveries also mean a new way of looking at education, learner personality, and learning motivation to master a foreign language. One of the main requirements of neurodidactics is individual talent. Based on a person's discovered abilities, we can develop their personality and expand their knowledge horizons. Based on neurodidactic principles, various multimedia programs have been developed for learning foreign languages, based on the current use of both brain hemispheres. Such educational courses allow improving the memorization process significantly <sup>[6]</sup>.

The left hemisphere is the centre of analytical thinking, speech, and logic. The right hemisphere is responsible for synthetic thinking. It reflects qualities such as creativity and imagination. It can be used to perceive colours, pictures, music, and rhythm. Stimulation of brain cells causes a positive change and development of neural circuits in the brain. The left and right hemispheres of the brain work simultaneously, "learning" new words. Oral speech is directed to the left hemisphere and the

accompanying images (visualization) are directed to the right hemisphere <sup>[7]</sup>.

If several emotions are used in learning a foreign language at the same time, certain language schemes are developed in the brain, which speeds up the process of memorization and prevents forgetting vocabulary. Vocabulary is sort of "built into" the brain and then automatically and naturally used in conversation. Choosing the right textbooks is equally important because both channels of perception — vision and hearing — are involved in learning. Therefore, good acoustics and lighting in classrooms, quality printing of teaching materials, and quality recording should be kept with no background noise when listening to texts <sup>[11]</sup>. The learning process is about a strong connection between neurons (neural cells) and the formation of neural circuits. Each neuron has several nerve fibers, at the end of which there are so-called synapses. They transmit impulses and information to other synapses, and consequently, to neurons. The impulses and information are received more slowly with age. A learner can learn a lot, but information is not processed that fast. It takes longer to store information in memory, which slows down the whole learning process <sup>[7]</sup>.

Researchers note that emotions are also important in the learning process. The middle part of the brain is considered the centre of emotions. Human memory and motivation are related to emotions. Interestingly, we remember the most positive and negative situations in our lives, and conversely, we do not remember our less emotionally important situations. For this reason, many foreign language teachers consider emotions a kind of key to successfully foreign language learning. Emotions color life, strengthen people's memories, and act as powerful motivators. Recent results have shown that emotions are a special driving force in stimulating learning <sup>[12]</sup>.

As empirical studies of the Russian language <sup>[13]</sup> and foreign authors <sup>[6]</sup> shows progress in individual language acquisition. No brain can process information immediately. In addition, each person's brain, influenced by its own experience and anatomic features, processes and evaluates information in its own way. The question is: How do we perceive the world and how do we interpret our perceptions? From the evidence of people who speak a larger number of foreign languages, we know that the hardest part was learning the first foreign language. The more they learned languages, the easier it became for them to learn other languages <sup>[6]</sup>. If a person does not speak a second language well enough other than their mother tongue, specific centres of the brain are best activated when a person speaks or reads more in the second language <sup>[6]</sup>.

Recent neuroscientific and psychological results show a great deal of information about how a person learns. There is no unique way to learn, including the learning of foreign languages. Each learner has their own learning style. If it is possible to recognize how the brain "learns" and understand the mechanism of learning, it is necessary to improve the process of teaching and learning. Many studies have shown and highlighted existing neurofunctional

circuits, which specialize only in processing some special language aspects in the process of language learning [6].

The neurodidactic approach to language learning at the empirical level has been verified as one of the most effective ways to cope with early sclerotic changes in the brain.

## Methods

An experiment was conducted in our study based on the methodology proposed by Chinese researchers — theoretical and practical EMDR (Desensitization and reprocessing of eye Movement) [9]. The study involved 30 people who read Russian as a foreign language.

The technique used in our experiment was psychological therapy, which was divided into eight stages. We have proven the effectiveness of EMDR in solving learning problems and improving students' performance in the studied subject — especially, Russian as a foreign language and its disciplines.

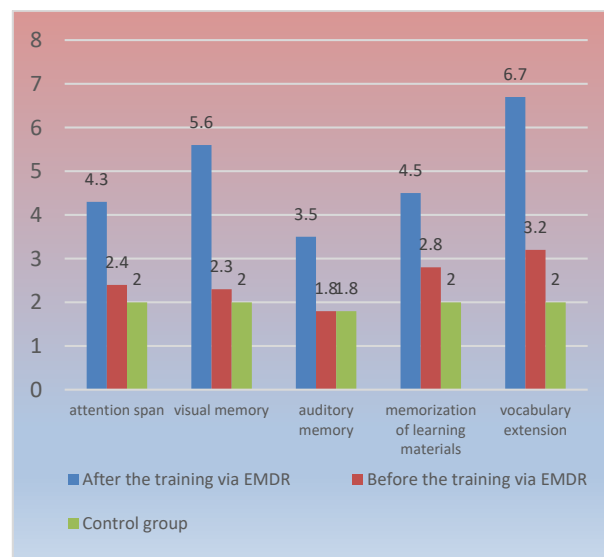
Single-photon emission computed tomography (SPECT) shows that after EMDR use, there is increased activity of the anterior cingulate cortex and left frontal lobe, i.e. increased the activity of the limbic system, which implies better control of cognitive and emotional systems.

Our study was focused on an interpretive reading of this approach, which is considered a very useful tool for improving cognitive abilities. Our focus was on explaining the effectiveness of the AIP (Adaptive Information Processing) model in skills acquisition and foreign language learning. The purpose of this study was to define an efficiency protocol including work stages, methodologies, and methods that can be used in any educational institution to improve students' ability to learn a foreign language.

The study used the EMDR sessions method: a) paying attention to eye movements or other stimuli and b) at the same time, focusing on the most significant elements of the learning experience.

## Results

As a result of the experiment, participants were divided into experimental and control groups.. Indicators of material memorization, its acquisition, and also other significant characteristics of the conducted research are shown in Figure 1.



**Figure 1:** The results of the participant survey (experimental and control groups)

Therefore, it can be stated that EMDR-based training allows to improve the memorization rates by almost 50% and can be used successfully in foreign language teaching. For the majority of observed students, the experimental study confirmed the idea of students' language development as a linear, and unidirectional progress in native learning. Mother tongue in learning a foreign language has a negative effect on acquiring knowledge of a new language, judging to the results of a survey of the control group. Summarizing the results, we found that cognitive linguistics methods are much more effective than traditional learning for the development of memory and attention, as well as the successful and sustainable extension of active vocabulary. Empirical research has also confirmed the thesis that the human brain is neuroplastic, which is due to a feature of the brain that is constantly adapting to new conditions, especially the new linguistic environment. Stimulating memory and memorization skills based on the EMDR method proves to be effective in comparison with traditional methods of learning and helps to solve the problems of academic achievement in the process of learning a foreign language.

## Conclusion

Neuroscientific studies have attracted a lot of attention in the last few years in many countries around the world. A new model called "neurodidactics" has been introduced. Researchers focused on neurodidactics believe that this approach allows educators to implement the concept of "brain — adequate learning". They also argue that the emotional foundation is at the heart of the learning process. However, many questions about neurodidactics and neurobiology remain open. Neurobiologists explore, for example, the neural foundations of the learning process, but they cannot see the complexity of the tasks that educators must perform each day. The future of foreign language

teaching and learning, not excluding the relationship between educators and students, requires more detailed empirical research in the field of neurodidactics.

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