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**NEUROPEDAGOGY:**

**A CONCEPT OF BRAIN COMPATIBLE TEACHING A FOREIGN LANGUAGE**

*Introduction. This study focuses on the premises of teaching a foreign language (FL) within the framework of Neuropedagogy – an interdisciplinary field that integrates cognitive science, psychology and pedagogy, and combines scholarly achievements of modern neurosciences.*

*The purpose of this article is to expose the theoretical assumptions on Neuropedagogy and elucidate how they can be applied in the FL classroom in order to enhance sought-for learning outcomes.*

*Results. Due to the new data in the neuropedagogical domain, it is possible to identify cognitive profiles of students, which can significantly conduce to their FL acquisition. Specifically, Neuropedagogy addresses such issues as hemispheric lateralization and brain compatible learning; attention, memory, and learning; emotion, stress, and motivation; multisensory perception and sensory*

*preferences; learning, cognitive and epistemic styles; personality types of students; their prominent multiple intelligences etc.*

*Withal, a special emphasis in the article is placed on the brain waves. In particular, it is reported that the alpha-theta wave is most conducive to FL learning. This state can be achieved through the exposure to Baroque music, as it lulls learners into a relaxed psychological condition, whereas their mind is alert.*

*Furthermore, since every learner acquires, processes and assimilates the incoming information in their own way, different types of students are characterized in terms of their learning and epistemic styles. They are compatible with the VARK sensory model and meant to assist instructors in developing effective strategies of teaching. The idea is also introduced to correlate Neuropedagogy with*

*intensive learning, which is targeted at inducing in students a psychologically relaxed yet mentally alert state conducive to foreign language acquisition.*

*Conclusion. Neuropedagogy offers an updated vista of FL acquisition grounded on neurobiological evidence. Its import is to ensure quality education based on knowledge about the structure and functions of the human brain, benefits of multisensory and multimodal perception, types of multiple intelligences, differences in brain hemisphere functions, styles of perceiving and processing the input, advantageous conditions for memorization, responses to stress and pressure, etc.*

**Keywords:** *Neuropedagogy; brain-compatible teaching and learning; multisensory and multimodal learning; personality types; multiple intelligences; hemispheric lateralization; learning and epistemic styles; accelerated learning.*

**Introduction** This paper addresses the issue of brain friendly teaching and learning a FL within the framework of Neuropedagogy – a relatively new pedagogical trend that integrates neuroscience, psychology and pedagogy (including didactics) and combines scholarly attainments of modern brain sciences. It is a new look at education based on the implementation of educational strategies and technologies developed on the basis of research in the field of brain functioning. Interestingly, the term was introduced by a German mathematician-didactic Gerhard Preiss in the late XX<sup>th</sup> century to denote an interdisciplinary field, which “employs scientific data on the brain organization in the processes of mastering different types of material, taking into account the compatibility of individual profile of lateration of subjects and teachers in the course of study” [1, p. 41].

**Purpose and Tasks.** This article is aimed at revealing the basic principles of Neuropedagogy and exposing how they affect foreign language acquisition (FLA). Specifically, the data that follow divulge the role of learning and epistemic styles, dominant hemispheres, multiple intelligences, and the premises of intensive learning in a language course [2; 3; 4]. They require cursory clarification.

**Results. Learning Styles in the FL Classroom.** It is recognized that every learner acquires information in their own way. To this effect, scholars attempt to characterize different types of learners in terms of their “learning styles” – “the overall patterns that give general direction to learning behavior” or approaches that students might make use of in the process of FLA [5, p. 9]. Though learners are unique in their inborn abilities and brain capacities, it is possible to single out most common oppositions of students generalized by a number of scholars [6, p. 1–3; 7; 8; 9; 10, p. 44].

*Activists vs. Reflectors.* Activists learn best by doing. The quality of their mental performance can significantly increase if they are involved in new experiences associating and interacting with other students. Contrastively, reflectors acquire new knowledge and skills by observing what is going on around them. They tend to analyze a situation from different perspectives before arriving at a balanced solution and producing an output.

*Theorists vs. Pragmatists.* Theorists are inclined to delve into the issue before taking action. They require models, schemas, charts, concepts and facts for obtaining positive results in learning. Such students can demonstrate encouraging mental performance, if they are set a clear goal and provided with an opportunity to question and probe. Adversely, pragmatists absorb and assimilate the subject matter better provided it can be implemented in real life. Withal, pragmatists have to be demonstrated the techniques with clear practical benefits.

*Convergers vs. Divergers.* Convergers excel in applying ideas and theories into practice. Commonly, such learners give preference to technical tasks, and are less interested in establishing interpersonal relationships. They succeed in solving problems and finding solutions to ambiguous issues. They are efficacious in experimenting with new ideas and applying them to real life situations. Contrastively, divergers are more sensitive and primed to cooperate with other learners. They differ from other types of learners in their ability to analyze a situation from different perspectives. They prefer observing rather than doing, and tend to use imagination to solve problems. Divergers may benefit from activities like idea-generation and brainstorming.

*Assimilators vs. Accommodators.* Learners of this type take a logical approach to whatever they are engaged in. They require a clear explanation from the teacher rather than a practical engagement. Assimilators succeed in processing voluminous amounts of information and structuring it into a logical format. Besides, their learning is more resultant, if they are exposed to understandable theories. Such students better perceive lectures and successfully deal with analytical models. In contrast, accommodators possess a fundamentally different set of qualities. They are better at employing intuition rather than logic. Moreover, they take account of other people's analysis and adopt it to solve their own problems.

*Adaptors vs. Innovators.* Adaptors work effectively within a system, considering any change as a matter of elaboration of whatever already exists. Such students are methodical, organized and persevering. Dealing with circumstantial work, adaptors are very accu-

rate. Innovators, on the other hand, have a strong propensity for adaptation to a new learning environment. However, it may be difficult for them to perform monotonous tasks, as their potential and creative nature can be hardly unleashed in such conditions.

*Random Learners vs. Sequential Learners.* Random learners gladly carry out experiments in order to find a solution to a problem; at that, they are frequently guided by intuition. Typically, such students apply a trial-and-error approach and readily take risks. Despite their creativity, random learners may find it arduous to explain how they have arrived at a solution to a problem. Their ability to learn can significantly increase if they work in a competitive environment. Conversely, sequential learners require a well-structured learning environment. They are not so independent in making decisions as random learners, so it is immanent for them to rely on others to complete an assignment. They tend to apply new ideas pragmatically. Simultaneously, it can be challenging for them to participate in discussions that do not have a specific point.

*Non-Committers vs. Plungers.* Non-committers are students who do not demonstrate a great desire to be deeply involved in a learning process, shifting the responsibility on the teacher, who, as they presume, fails to provide them with an opportunity to participate. Contrary to them, plungers have a different distinctive feature – their mental performance can be largely dependent on the fluctuations of their mood, which may affect their motivation and achievements.

The engagement of the aforementioned oppositions of learners can significantly assist instructors in developing effective strategies of teaching. Within the theory of learning styles the latter are defined as “cognitive, affective and physiological features that perform the function of relatively stable indicators of how students perceive, interact with, and respond to the learning environment, which reflect genetic coding, personality development, and environmental adaptation” [10, p. 44].

The literature concerning the concept of learning styles is now quite voluminous; therefore, it is essential to investigate the basic types of learners, revealed in these theories as they can essentially facilitate FLA. They require cursory specification in terms of personality types, sensory preferences and a desired degree of generality.

*Personality type* (often called psychological type) is a concept based on C. Jung’s research on psychological types [11, p. 3–7]. His studies evolved around the idea that every person has a basic orientation in the world, which indicates the directions in which energies or interests flow: to the outer

world of people and events (extroversion, E) or to the inner world of ideas (introversion, I). C. Jung defines it as an attitude toward the world. Either type, in the conscious aspects of life, processes information either through the senses (S) or by intuition (N) and makes decisions on the basis of this information either by logical, impersonal analysis (thinking, T), or on the basis of personal, subjective values (feeling, F). The scholar considers both thinking and feeling to be rational processes and so the term “feeling” cannot be associated with emotions in this very classification. The Jungian dichotomies can be symbolized in the following way (1) direction of energy/interest: E or I; (2) perceiving functions: S or N; (3) judging (decision-making) functions: T or F.

Extending the idea, K. Briggs added a fourth pair to the Jungian pairs – (4) a judging (J) or perceptive (P) orientation in the world. The scholar arrives at the conclusion that individuals tend to act initially in either the perceiving or the judging manner. This given, some people (P) prefer accumulating information and adapting it to situations as they arise; others (J) tend to lead a more structured, ordered existence, trying to control events [12, p. 246]. (Visual representation of personality types and their basic features are systematized in Table 1).

Table 1

Jungian Dichotomies  
Direction of Energy/Interest

Extroverts (E)	Introverts (I)
<ul style="list-style-type: none"> <li>– enjoy socializing, are dependent on interaction with others;</li> <li>– prefer action;</li> <li>– act speedily;</li> <li>– communicate effortlessly;</li> <li>– are practically oriented;</li> <li>– get energized by associating with others.</li> </ul>	<ul style="list-style-type: none"> <li>– tend to avoid interactions and prefer a quiet atmosphere for better concentration;</li> <li>– incline towards ideas and concepts;</li> <li>– are not associative;</li> <li>– rely on insights;</li> <li>– give preference to individual work.</li> </ul>

On the other hand, extraverts and introverts can cooperate completing different tasks together with the teacher’s assistance. The data indicate that it is necessary to set the time-frame in the FL classroom in order to keep extraverts’ enthusiasm to a manageable level. One more possible variant of interaction between those two psychological types is to alternate a lead person in conducting FL discussions. It can provide introverts with an opportunity to participate in activities on the same level with extraverts. Another type of personality is their perceiving functions, which is summarized in Table 2 [12, p. 249].

Table 2

Perceiving Functions

Sensing (S)	Intuition (N)
<ul style="list-style-type: none"> <li>- utilize senses and powers</li> <li>- of observation;</li> <li>- learn through regular analysis;</li> <li>- prefer established methods;</li> <li>- like routine work;</li> <li>- learn gradually;</li> <li>- require teacher's guidance;</li> <li>- appreciate consistency.</li> </ul>	<ul style="list-style-type: none"> <li>- are imaginative, consider different possibilities;</li> <li>- think in abstract, futuristic, large-scale, and non-sequential ways;</li> <li>- rely on inspiration;</li> <li>- rapidly arrive solutions;</li> <li>- prefer independence of their own cognition;</li> <li>- favour facts rather than theories;</li> <li>- dislike routine.</li> </ul>

However, to eliminate any difficulties related to these two personality types, it is important to adopt a variety and choice of activities in the classroom: sometimes – a highly organized structure for sensing-sequential learners and at other times – multiple options and enrichment activities for intuitive-random students (Table 3) [12, p. 249].

Table 3

Decision Making

Thinking (T)	Feeling (F)
<ul style="list-style-type: none"> <li>- objective and analytical;</li> <li>- learn through the cause-and-effect linkage;</li> <li>- tend to be logical, tough-minded</li> <li>- and impartial;</li> <li>- choose to be regarded as competent.</li> </ul>	<ul style="list-style-type: none"> <li>- understanding;</li> <li>- take decisions based on personal values and standards;</li> <li>- strive for harmony;</li> <li>- need to be praised for active participation and hard work.</li> </ul>

Furthermore, it is considered that FL teachers can assist a thinking type of learners to illustrate greater compassion to their feeling group-mates. Under such conditions, a feeling type of learners can alleviate their emotional state while interacting with their opponents, revealing the ability of living in the world (Table 4) [12, p. 250].

Table 4

Living in the World

Judging (J)	Perceptive (P)
<ul style="list-style-type: none"> <li>- prefer existing in a planned and orderly way;</li> <li>- rapidly reach judgments or completion;</li> <li>- are diligent and industrious learners;</li> <li>- prefer written information;</li> <li>- choose specific tasks with deadlines.</li> </ul>	<ul style="list-style-type: none"> <li>- stay available for continuously new perception;</li> <li>- take FL learning less seriously, treating it like a game to be enjoyed rather than a set of tasks to be accomplished;</li> <li>- do not feel comfortable with deadlines;</li> <li>- can demonstrate better results than closure-oriented learners in developing fluency.</li> </ul>

Notwithstanding, judging and perceptive learners provide a good balance for each other in the FL classroom. The former are task-driven students, and the latter can turn learning into an enjoyable process. That given, qualified FL teachers can intentionally create cooperative groups that embrace both types of learners, since they can benefit from collaboration with each other. Another important aspect, which should be taken account of in the FL course, is sensory preferences that are viewed as learning styles of students.

*Sensory Preferences.* This aspect of learning styles is closely connected with perceptual channels through which students perceive and process the new input. One of the most commonly employed frameworks that is often referred to when dealing with sensory preferences is the VARK model. This model was introduced by a teacher from New Zealand N. Fleming [13, p. 1].

The data offered by Fleming suggest that *visual learners* can achieve tremendous results if the teacher presents the learning material by dint of a number of visual aids like maps, charts, graphs, diagrams, highlighters, pictures, word pictures, and various spatial arrangements [14, p. 4-7].

*Aural students*, on the other hand, give preference to information that is spoken or heard. Numerous research has documented that learners with this modality learn best from discussion, oral feedback, emails, cell phone chats, texting, discussion boards, oral presentations, classes, tutorials, and verbal interactions with others. They enjoy classroom associations in role-plays and communication activities. However, this type of learners sometimes have difficulty with written assignments.

*Read/Write students* reveal encouraging results while taking notes and working with essays, textbooks, reports, definitions, printed handouts, web pages. The preference is given to read or written information. Commonly, this refers to those who choose to work with textbooks. Such learners place much emphasis on language accuracy and favour verbal expression of their thoughts.

*Kinesthetic students* can be characterized as such who have perceptual preference related to experience and practice (simulated or real). The key axis around which this type of students is shaped is that they are connected with reality, "either through experience, example, practice or simulation" [14, p. 6]. Their style is often referred to as "learning by doing". This mode employs the senses (sight, touch, taste and smell) to take in their environment, to experience and learn new things.

It must therefore be recognized that in order to simplify the comprehension of the subject matter, it is appropriate to implement multimodal learning in the FL classroom. This term is utilized to denote an externalized learning situation in which multiple sensory systems and action systems of the learner are activated. As O. Vovk points out, multimodal learning allows the material to be presented in more than one sensory mode – visual, auditory, and kinesthetic. It implies the usage of audio elements, images, recorded presentations, interactive audio-enhanced diagrams and aims to cater more to various learning styles of students [3, p. 60; 4, p. 132]. One more aspect that affects FLA is students processing the incoming information.

*Desired Degree of Generality.* Previous studies have illustrated that learners can be either global (focusing on the main idea) or analytic (concentrating on details). It is commonly recognized that *global* or *holistic students* enjoy interactive, communication activities in which they can accentuate the main idea and avoid analyzing details. It is effortless for them to complete a task without the provision of additional information. Withal, such learners possess a well-developed conceptual guessing ability.

On the other hand, *analytic students* tend to focus on details. They find it exigent to participate in more free-flowing communication activities. That given, analytic learners do not engage in eliciting or inferring ideas from the context unless they are sure of the accuracy of their guesses. Albeit, cooperation between global and analytic students could be very productive, specifically, for those who are involved in FLA.

Considering the abovementioned, it is plausible to conclude that teachers are supposed to be able to identify students' learning styles, since the obtained information can foster FLA and eliminate a number of problems in the FL classroom.

Another essential factor that should be taken into account in the process of FLA is the function of right/left hemispheres and their relation to learning styles of students.

Brain Hemispheric Lateralization and Learning Styles. Conventionally, the human brain is characterized as the vital organ of the central nervous system, which consists of billions of interconnected neurons and glia. Besides, the brain is considered to be a paired organ, as it is comprised of two halves (called cerebral hemispheres) that look similar. Both brain sides are involved in processing information, but one of them may be dominant in certain functions. This functional specialization is defined as brain lateralization [15].

According to the research evidence, the left hemisphere is responsible for analysis of the right visual field, right hand stereognosis (the mental perception of three-dimensionality by the senses), positive emotions, grammar and syntax, writing and speech. Unlike the left brain, the right brain takes charge of analysis of the left visual field, left hand stereognosis, recognition of negative emotions, prosody, spatial abilities and rudimentary speech. It is believed that brain lateralization can elucidate the issue of parallel processing the input [16].

Being a complex organ, the human brain performs a number of functions, which are crucial for normal existence of a human. Specifically, one of its main properties of the brain is an ability to acquire new knowledge. Each brain hemisphere contributes differently to maintaining this capacity; this functional division affects an individual's ability to learn and adapt to continuously changing environments [17, p. 44]. The disposed information allows presuming that people may utilize a preferred mode of cognitive processing, which is linked to activity on the part of the left or right cerebral hemispheres.

Interestingly, the right hemisphere processes information from the whole to the parts. It controls subjective skills and creative abilities. In addition, right-brain learners may experience a propensity for visualizing than thinking in words. Learners with this dominant hemisphere tend to deal with the problems via hunches, examining patterns and identifying similarities.

Conversely, the left hemisphere processes information in a reverse order, objectively analyzing data before drawing conclusions. This side of the brain effectively works with definite and established information, solving problems logically and sequentially. Typically, left-brain students explore parts and analyze differences. Given that, such learners can show encouraging results while doing multiple-choice tests rather than writing essays. Nevertheless, no one is completely right-brain or left-brain. Conventionally, people tend to utilize their dominant side for processing information. However, the process of learning and thinking is improved when both sides of the brain are involved in problem solving [18, p. 154].

Complementary to learning styles and brain hemisphericity, epistemic styles can significantly affect the perception and processing of information in a FL course.

Epistemic styles. Those are viewed as the ways via which an individual evaluates and tests the validity of their knowledge. According to J. Royce, there are three fundamental ways of knowing, specifically rationalism,

empiricism and metaphorism. These three ways are claimed to be basic as they depend on both cognitive processes and epistemological pertinence. Royce asserts each of the “isms” presents a feasible approach to reality, applying different criteria for knowing. *Rationalism*, for instance, is based on logical consistency, which means that a person will consider any issue as a true one if it is logically consistent. On the contrary, an individual can reject information as false if it lacks logical causal relationships. *Empiricism*, on the other hand, is grounded on the assumption that one knows within the boundaries of their perceiving. Knowing through the prism of *metaphorism* may be determined by the degree to which symbolic cognitions cause universal rather than idiosyncratic awareness. However, Royce maintains that none of these psychological processes functions autonomously from others, as learners cannot think independently of sensory inputs and the process of symbol formation. Similarly, they do not perceive without reasoning [19, p. 12].

Furthermore, *empiricists* tend to use primarily their perceptual cognitive processes. It is considered that such learners presume that the true knowledge can be received by reliable and consensual validation of data obtained by the senses. The empirical approach to knowledge gives preference to induction. Adversely, *rationalists* dominantly refer to their conceptual cognitive processes. Moreover, rationalists favor deduction over induction. Logical consistency is a focal point around which their assumption towards the true knowledge is formed. In contrast to rationalists, *metaphorists* prevalently employ their symbolic cognitive processes and regard that the viability of knowledge is more important than its validity. Such learners believe that knowledge is constructed symbolically, that is why they analyze information basically by analogies [20, p. 3]. It is obvious that every type of learners requires a particular way of presenting an educational content.

Besides, dominant intelligences also play a significant role in perceiving and processing the teaching material.

Multiple Intelligences (MI) Theory. Forasmuch as a FL course is an arduous process, it deems plausible to focus on the factors that enhance successful FL learning.

In the previous years, there has been an increase of interest in the nature of human intelligence and its influence on learning outcomes. Conventionally, intelligence is considered to be a single broad ability by dint of which most of logical and academic issues are resolved. However, this is not a view shared by everyone. A key limitation of this

approach is that students cannot be estimated according to a single scale of ability. That granted, intelligence might take multiple forms, which can be either subparts of a single broader ability or multiple “intelligences” in their own right [21, p. 68]. This assumption found its practical application in H. Gardner’s theory of multiple intelligences. The scholar advances the idea that there are eight different forms of intelligence, each of which functions independently of the others and represents different ways of processing information. Specifically, Gardner singles out such types of MI as [22]:

*Verbal-linguistic intelligence* – is closely connected with an individual’s ability to process information and produce work that encompasses written and oral language, such as speeches, emails, and books. Learners of this type involve the ability to effectively use language to express themselves rhetorically or poetically; and language as a method to store information.

*Logical-mathematical intelligence* – is based on the ability to tackle abstract problems, make calculations, and derive equations. It involves the ability to discern patterns, cogitate deductively and think logically.

*Visual-spatial intelligence* – provides an opportunity to read maps and successfully analyze other types of graphical information.

*Musical intelligence* – involves an individual’s ability to produce and make meaning of different types of sound. It also implies a propensity for recognizing and composing musical pitches, tones, and rhythms.

*Naturalistic intelligence* – is premised on the ability to identify, classify and manipulate elements in the environment.

*Bodily-kinesthetic intelligence* – refers to an individual’s ability to acquire knowledge through movement. It is connected with the usage of mental abilities to coordinate bodily movements. Amenable to Gardner, mental and physical activity can be viewed as related issues.

*Interpersonal intelligence* – is grounded on the ability to recognize and understand other people’s emotional states, moods, motivations, intentions, and desires.

*Intrapersonal intelligence* – relates to people’s ability to identify and assess the same features within themselves.

More recently, Gardner has introduced two additional intelligences (1) the “mental searchlight intelligence” and (2) the “laser intelligence”. The scholar claims that individuals with high IQ test scores may possess “a mental searchlight”; that gives them a possibility to analyze wide spaces in an efficacious way thus allowing them “to run society smoothly”, whereas experts in the arts, sci-



ences, and trades can have a “laser intelligence” that aids them in generating “the advances of society” [22].

It must therefore be recognized that everyone possesses all eight types of MI listed above at varying levels of aptitude. It is worthwhile to emphasize that MI do not have the same meaning as learning styles. Gardner asserts that MI represent different intellectual abilities, whereas learning style represent the ways in which an individual approaches a range of tasks [22]. Although the MI theory is questioned by a number of scholars, its practical utility is actively supported by educators. Particularly, it is believed that the MI theory can become a conceptual framework for developing and reflecting on curriculum assessment and pedagogical strategies. Withal, the premises of the MI theory can be effective for FLA.

The aforementioned assumptions concerning learning and epistemic styles, brain hemisphericity, and multiple intelligences have become an integral part of intensive learning, aiming to facilitate teaching FL communication.

Intensive or Accelerated Learning. In recent years, researchers have become increasingly interested in developing a new theoretical framework, which can help educators to reduce instructional time and, at the same time, provide learners with the profound input. The solution to this problem can stem from the possibility of employing the principles and techniques of intensive learning in FL instruction.

Intensive or accelerated learning is identified as a method, which implies creating a positive learning environment where students are able to absorb, assimilate and memorize concepts by overcoming traditional barriers of learning. Intensive learning is a multisensory method in which the student is the central point and learning/teaching is collaborative. This process incorporates the following elements: creating a stress-free environment, acquiring knowledge and gaining the required language skills via interactive activities, integrating the materials to increase retention, providing active distributed practice, and applying the learned input in simulated situations. Intensive learning is conducive to FLA, since it engages the conscious and subconscious mind and the left and right brain hemispheres through a structured, sequenced set of communication experiences. The core idea of intensive learning is to activate the whole brain by dint of music, physical and mental relaxation, and interactive games [23, p. 81; 2, p. 60; 24, p. 152].

Intensive learning was devised by Bulgarian psychotherapist G. Lozanov, who defined

it as *Suggestopedia*. The scholar concentrates on the role of the subconscious in the acquisition of knowledge and claims that in every perceptive or mental activity it is possible to single out one pivotal complex of experiences and a great number of peripheral, background experiences. While perceiving speech, the basic thought of the content goes to the center of consciousness where it undergoes critical analysis and logical processing. However, the reaction can be triggered not only by a sense specific for speech, but also by the whole complex of accompanying stimuli non-specific for speech. Lozanov specifies that these stimuli can be expressed with non-verbal and paralinguistic means, a number of ideomotor movements unnoticeable for the mind, the authority of a speaker, and the physiological state of expectation or biological needs of the recipient. The scholar believes that these non-specific stimuli if synchronized can play some suggestive role by a change of the power of the words, increasing or decreasing it [23, p. 10].

Suggestopedia may activate multifaceted tapped capacities of a learner, increase their memory, thinking and imagination. Being exposed to suggestopedic instruction, learners can experience hypermnesia (super memory), which significantly outweighs the power of ordinary memory. Moreover, this method can trigger hypercreativity as intuition is highly engaged in a learning process and eventuated in states similar to inspiration. As a result, the manifestation of artistic, musical and even mathematical abilities of students may significantly increase both quantitatively and qualitatively [23, p. 13].

Furthermore, it is believed that a full mental capacity of learners is blocked by psychological barriers such as fear or anxiety. All these limitations may be desuggested by Suggestopedia, which aims to eliminate negative emotions, stimulate positive feelings and release the full mental power of students. In intensive learning FL instruction is accompanied with relaxation without arousing a feeling of fatigue. It is regarded as a pleasant experience, which has a favourable educational effect [23, p. 13].

One of the main benefits of Suggestopedia is the use of music and musical rhythms as an effective tool, which is determined to stimulate FLA [2, p. 65]. Soothing rhythmic music could induce in students the optimum state for learning, when the body is relaxed, but the mind is alert. In the FL classroom, learners are expected to arrange themselves comfortably in the chairs; a teacher dramatically reads a FL dialogue/text; the reading is accompanied by music at the background. It is believed that musical rhythms can posi-

tively affect body rhythms, namely heartbeat. In appliance with the research evidence, with slow heartbeat the mind efficiency may essentially increase. Lozanov recommends employing Baroque music in line with 50 to 70 beats/minute to achieve this goal [23, p. 13]. The effect of Baroque music on learning efficiency is essentially reflected in the influence on the brain waves, which are considered to be patterns of electrical activity occurring in the brain. They are pivotal to all aspects of brain functioning, namely emotions, thoughts and behaviors.

There are four types of the brain waves, ranging from low to high frequency. It is assumed that when the brain is alert and extensively involved in mental activities, it evokes beta-waves. Being of low amplitude, they are the fastest of the four different brain waves. Contrastively, alpha brain waves are characterized as slower and higher in amplitude in comparison with the beta-waves. They occur when the brain is in its resting state, after performing an arduous task. While relaxing or meditating, an individual can experience an alpha state. It can be achieved through the exposure to Baroque music. The theta brain waves, on the contrary, are typically of greater amplitude and slower frequency. A theta state is associated with an inner focus, dreams and vivid imagery. The delta brain waves occur in deep meditation or daydreaming [25].

Taking account of the aforementioned scientific evidence, Lozanov reports that the alpha-theta level is the most advantageous wave for learning. That provided, it is important to induce learners into the alpha-theta state of the brain and combine their both hemispheres, as under such conditions their memory performance can substantially improve. This state, which is conducive to acquiring new knowledge and skills, can be achieved through the exposure to Baroque music, as it stimulates relaxation [23, p. 77].

Lozanov suggests that teaching can be more productive if “peripheral learning” is engaged. This term can be defined as learning from the environment. That granted, FL classrooms are supposed to be decorated with colourful posters, which contain relevant lexical and grammatical items in the target language. Eventually, learners will absorb this information naturally and effortlessly, as it is not treated as a course material, which should be purposely learnt.

Furthermore, Lozanov promotes multimodal interactive learning, which can become an effective alternative to traditional FL instruction. It is assumed that the active usage of multimedia in teaching can provide ample opportunities for presenting different

types of content (text, video, audio, images, interactive elements) to cater more effectively to different learning styles and modal preferences of an increasingly diverse student body [23, p. 13].

It is clear therefore that intensive learning is never tedious, stressful or judgmental. It is primarily holistic, as its methodology aims to engage students on all levels: intellectually, emotionally, kinesthetically, consciously, and subconsciously. To this end, teachers can make use of a great number of tools: brainstorming, buzz groups, debate, chalkboards/whiteboards with colour, films/video, games/crossword puzzles, memorization games, mind mapping, question and answer sessions, project teams, problem solving tasks, role-playing, revisions in a game format, songs and storytelling [26, p. 63].

**Conclusions.** To summarize, Neuropedagogy offers a new vision of teaching and learning grounded on numerous neurobiological research. This new scholarly trend examines education in three dimensions: emotional, cognitive, and balanced. It also provides teachers with a rational explanation of teaching and learning mechanisms, and clarifies what factors can positively affect a language course. Learning may be defined as a result of electrochemical processes occurring at the brain level. The potential to learn cannot fully depend on the genetic inheritance of an individual, as learning is the experienced-based modification of hard-wired structures in the brain.

The basic premises of Neuropedagogy have found its practical implementation in learners’ cognitive profiles, which embrace learning and epistemic styles, functions of brain hemispheres, multiple intelligences, and reactions to suggestive techniques provided by intensive learning. The latter is formed around subliminal and peripheral learning, which activates tapped capacities of students’ brain via creating a stress-free environment, employing Baroque music and introducing multimodal interactive learning.

**Further Implications.** This study though far from being conclusive offers several insights into the issue of teaching English communication within the framework of Neuropedagogy. The suggested assumptions are compatible with on-line technologies, which outlines an implication for further research in this domain.

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### НЕЙРОПЕДАГОГІКА: КОНЦЕПЦІЯ ГАРМОНІЙНОГО НАВЧАННЯ ІНОЗЕМНОЇ МОВИ

**Анотація.** Статтю присвячено навчанню іноземної мови (ІМ) в аспекті нейропедагогіки – міждисциплінарної наукової галузі, яка об'єднує науковий доробок когнітивної науки, психологію та педагогіку, а також нейронауку.

Метою цієї статті є висвітлити теоретичні засади нейропедагогіки і проілюструвати, як вони можуть бути враховані на заняттях з ІМ для досягнення бажаного навчального результату.

Результати. Підкреслюється, що для того, щоб поліпшити засвоєння ІМ, необхідно визначити когнітивні профілі студентів, що можливо завдяки сучасним даним нейропедагогіки. Зокрема, нейропедагогіка

звертається до таких питань, як півкульна латералізація та узгодження функцій головного мозку; увага і пам'ять та їхній зв'язок із навчанням; вплив емоцій, стресу й мотивації; мультимодальна перцепція; навчальні, когнітивні та епістемологічні стилі; типи особистості суб'єктів пізнання тощо. Особливу увагу у статті приділено ролі мозкових хвиль у навчанні ІМ. Зокрема, акцентується, що альфа-тема хвиля є найбільш сприятливою для оволодіння ІМ, яка може викликатися музикою стилю Бароко, оскільки вона приводить студентів у такий стан, коли вони є психологічно розкритими, але когнітивно активними. У також статті характеризуються типи особистос-

тей суб'єктів в аспекті їхніх навчальних та епістемологічних стилів. Вони узгоджуються з сенсорною моделлю навчання і мають на меті допомогти викладачу в розробленні ефективних стратегій навчання. Пропонується також скорелювати нейропедагогічний доробок з інтенсивним навчанням ІМ, оскільки останнє націлене на досягнення двоякої мети – підтримувати у студентів психологічну розкутість, поєднану з когнітивною активністю.

*Висновки.* Нейропедагогіка пропонує новий погляд на оволодіння ІМ, що ґрунтується на нейробіологічних наукових доробках. Її метою є забезпечити якісне навчання з урахуванням даних про структуру й функціонування головного мозку, переваги мультисенсор-

ного та мультимодального навчання, типів множинного інтелекту, різницю в півкульній латералізації, стилях сприйняття та оброблення вхідної інформації, таких чинників, як пам'ять, увага, стрес, мотивація тощо.

**Ключові слова:** нейропедагогіка; гармонійне навчання; мультисенсорне й мультимодальне навчання; типи особистостей; множинний інтелект; півкульна латералізація; навчальні й епістемологічні стилі; інтенсивне навчання.

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