

## **NEUROLINGUISTICS IN THE CLASSROOM: USING BRAIN RESEARCH TO IMPROVE LANGUAGE TEACHING**

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**Abstract.** The article outlines the impact of the application of neuro-pedagogical knowledge in foreign language teaching on the pupils' mastery of English as a foreign language, specifically on the level of their four communicative language skills. The indications of recent neurolinguistic research that foreign language teaching (FLT) must be based on enabling pupils to develop their linguistic abilities through participation in authentic, real life communication situations, or at least situations resembling real life in the classroom. (1) Using brain research methods play an important role to improve teaching foreign languages for people in the classroom. Therefore, this paper explores how to use brain to memory words and phrases in neurolinguistic field.

**Keywords:** Neurolinguistics, neuroscience, language acquisition, long-term memory (LTM), project-based learning, service learning

Introduction: Neurolinguistics is the branch of linguistics that studies how the brain processes and produces language. It combines insights from neuroscience, psychology, and linguistics to explore the neural mechanisms and structures that underlie language abilities. (2) Neurolinguistic researches have a lot of applications for improving language teaching methods, such as enhancing motivation, memory, and learning outcomes. Research findings suggest that second languages (L2) are generally acquired through the same brain structures that support first language (L1) learning (Abutalebi, 2008). This phenomenon appears even in the context of grammar acquisition among late L2 learners, which runs counter to expectations based on critical period hypotheses. Nevertheless, differences in how the brain handles L2s can emerge, often reflected in a broader activation of the neural circuits used for L1 (Abutalebi, 2008). (3) The study investigates these structural differences are represented and processed in the brain.

Literature review: Neuro-Linguistic Programming can be divided into three terms, neuro, it reflects the fundamental idea that behavior originates from the neurological processes of vision, hearing, smell, taste, touch and the sensation of how the world is perceived through these organs (Díaz, 2017), once the information is entered through

the senses, its meaning is extracted and then followed, here the processes responsible for the storage, processing and transmission of data play an important role, Neurology includes not only invisible thought processes, but also visible physiological reactions to ideas and events. The linguistic part indicates that language is used to organize thoughts and behaviors and thus enter into communication with others, programming indicates the ways in which ideas and actions are ordered to obtain results (Mendoza, 2019). That is, systemic thinking and behavioral processes, then through perceptions a representation of what reality is can be created, the basis of NLP is the idea of the structure and subjective experience of a person, how what is organized that is seen, heard, heard and felt.(4)

Information is transferred by electrical signals, creating points of contact with other neurons, forming networks. Sinani (2012) says that such networks are formed by groups of

cells, named “neuro-functional scheme”. The activation of these neurons could be influenced

by a genetic factor, such as, for example, our ability to cry as a baby. Genetic activation

involves the human functions that do not have to be learned, our behaviors, which are natural

for everyone. Other cases of neural-function schemes will depend on the input of the

environment or/and the person who gives these inputs. Language is related to both

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Talking about specific neural networks, it is important to know the processes that involve the language network. The most relevant language processes are related to the auditory input, acoustic-phonological, syntactic and semantic comprehension. As stated by Angela D. Friederici (2011), when talking about spoken language, the comprehension starts with the acoustic-phonological analysis of the speech input.

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Furthermore, it was found that the brain's activation could be also related to the origin of the language. In her analysis of different Indo-European languages, Friederici (2011) observed that all followed a subject-verb sentence order. Friederici used the term "canonical"<sup>1</sup> to refer to this language structure. The study's methodology applied canonical and noncanonical sentences and analyzed the brain activations for each structure. In both cases, the Broca's area was most activated during the interpretation of these sentences. As the result, Friederici (2011) concluded that Broca's area is essential for processing syntactic, mainly in syntactically complex sentences. In addition to Broca's area, the left dorsal posterior IFG, the Inferior Frontal Sulcus (IFS) and the mid-posterior Superior Temporal Sulcus are also activated by syntactic complexity (Friederici, 2011).

Method: Brain imaging studies suggest that language control mechanisms play a key role in bilingual language processing. When individuals process a less dominant L2, the activation of brain regions involved in cognitive control may indicate internal conflict between L1 and L2, which these control areas help manage. In general, functional neuroimaging not only confirms the anatomical insights from earlier clinical studies but also introduces novel findings that challenge and reshape traditional ideas. For instance, with regard to Broca's area, recent imaging studies show that it is not a single unit, but is composed of subregions dedicated to phonological, semantic, and syntactic processing (Bookheimer, 2002, as cited in Abutalebi, 2008). (5)

The following teaching methods and approaches include context as a critical component:

1. Problem-based learning: This approach is to identify a problem, to understand its root causes and to find effective solutions to solve it.

2. collaborative/cooperative learning: this learning process is to work together with group to achieve a shared learning goal.

3. project-based learning: Project-based learning (PBL) or project-based instruction is an instructional approach designed to give students the opportunity to develop knowledge and skills through engaging projects set around challenges and problems they may face in the real world. (6)

4. service learning: Service learning is all about experiential learning — that is, learning through experience, but by way of community service. Universities partner with local groups and organizations that are willing to have students as a part of their programs. The service is usually in line with what the student is learning, and that learning is incorporated into the classroom by way of assignments, discussions. (6)

These critical things are that they should be used at the students' developmentally-appropriate level of learning, that the diversity of students should be considered, that the environment should be established to support self-regulated learning, that multiple intelligences should be considered, and that appropriate authentic assessment should be included. Teachers' role in contextual teaching differs from the roles of those in teacher-fronted classes. They are facilitators rather than plain teachers. They continuously draw on their students' prior knowledge and experience when building up their learning environment. Since they are not the ones transmitting knowledge all the time, they engage their learners actively in their learning. (7)

Results: By the use of neuroscience discoveries and the analysis made in the previous sections – establish an overview of how neuroscience can contribute to teachers' methodologies and facilitate the teaching and learning of a foreign language. Finding ways to use neuroscience as a support for teachers' methodologies and use neuroscience contributions in order to explain different ways to learn an L2. (8)

According to Guy and Byrne (2013, p. 40) the learning process involves, obviously, the working memory (WM) and the long-term memory (LTM), as well as the prefrontal cortex (PFC), the anterior prefrontal cortex (APFC), and the dorsal and ventral lateral prefrontal cortex (DLPFC and VLPFC). To the authors, in an educational environment, the process of stimulating the WM and achieving the comprehension of what is being learned can be helped by applying tasks in which students will focus only on the point of the study, without distractions. However, the WM and the LTM do not have a simple connection. Although the WM is important for gathering the information at the same point it is being received, the LTM is primordial for the storage of it. As stated by Guy and Byrne (2013), there are different types of LTM, for example, the semantic memory, which stores the facts and associates it to others knowledge, creating a semantic framework. By this framework, it is formed the basis of thought and learning, resulting in the effectiveness of the learning.

Another aspect that teachers can apply in their classroom, as stated in Guy and Byrne (2013, p. 41) is default tasks, that is, tasks where students should think about what is missing and establish the association among concepts by themselves. The authors also suggest for teachers to work with students in groups in this sort of activities, so they could share their knowledge and built new networks. Complementing their studies, the authors found that metacognition is a result of increases in gray matter volume in the association prefrontal cortex (APFC) and the dorsal lateral prefrontal cortex (DLPFC). Metacognition is important during the learning and teaching processes because the self-conscious of the learner and his/her ability to judge their own mistakes

Further the analyses by Guy and Byrne (2013), Kuhl (2011) studied the language learning process in young children, focusing more on the acquisition of a second or foreign language. The author stated that the first learnings of a child are a result of implicit inputs that happen by the interaction of the child and the external environment; however, in the language process, to develop these inputs the child needs a nice social interaction with another human being, which will determine the levels of the child language. (9)

Discussion: Research has shown that different approaches of language learning such as Problem-based learning, collaborative/cooperative learning, project-based learning, service learning, are processed in different regions of the brain. For example, the left inferior frontal gyrus is involved in syntactic processing by memorizing words, or the processing of sentence structure, while the left temporal lobe is involved in semantic processing, or the processing of meaning. This information can be used to develop new approaches to language learning and therapy that target specific aspects of language processing. The findings of this study highlight the growing importance of

integrating neurolinguistic principles into language classrooms. Brain research demonstrates that language acquisition is not merely a cognitive process but also a neurobiological one, involving the activation of specific brain regions such as Broca's and Wernicke's areas (Friederici, 2011). (10) Understanding how the brain processes linguistic input allows teachers to design more effective methods that align with natural neural mechanisms of learning. One of the most significant implications is the emphasis on multisensory learning. Neuroscientific evidence shows that engaging multiple sensory modalities—such as visual, auditory, and kinesthetic input—enhances memory retention and strengthens neural connections (Immordino-Yang & Damasio, 2007). Therefore, language teachers can improve student outcomes by incorporating activities that stimulate different areas of the brain, such as storytelling with visuals, role-playing, and rhythmic repetition. Another important aspect is the role of neuroplasticity—the brain's ability to reorganize itself through learning. The classroom context can leverage this phenomenon by providing repetitive and meaningful language exposure, which reinforces neural pathways (Li, Legault, & Litcofsky, 2014). This suggests that consistent practice, feedback, and immersion activities are essential components of effective language pedagogy. (11)

**Conclusion:** The integration of neurolinguistics in the classroom provides an important component to understand how the brain learn and memorize language. The neurolinguistic findings to classroom practice bridges the gap between theory and pedagogy. Teachers who understand how the brain learns can better tailor their strategies to support individual differences, foster engagement, and maximize learning outcomes.

## **References**

1. Dana Hanesova, Anna Pávová. THE IMPACT OF NEUROLINGUISTIC RESEARCH FINDINGS ON IMPROVING FOREIGN LANGUAGES TEACHING. November 2023 Conference:16th annual International Conference of Education, Research and Innovation
- 2.<https://www.linkedin.com/advice/3/what-benefits-neurolinguistic-research-improving-language>
3. Hagen, L. K. (2008). The bilingual brain: Human evolution and second language acquisition. *Evolutionary Psychology*, 6 (1), 43-63.
4. José.A.V.M. Neuro-linguistic programming in the teaching-learning process of English as a foreign language. June 2022. PalArch s Journal of Archaeology of Egypt / Egyptology 18(4)

5. Hagen, L. K. (2008). The bilingual brain: Human evolution and second language acquisition. *Evolutionary Psychology*, 6 (1), 25-37
- 6.. The Experiential Learning Theory of David Kolb/Understanding the four stages of learning. By Kendra Cherry, MEd Updated on February 18, 2025
7. <https://mybrightwheel.com/blog/developmentally-appropriate-practice>
8. [https://www.researchgate.net/publication/Contributions\\_of\\_Neuroscience\\_Knowledge\\_to\\_Teachers\\_and\\_Their\\_Practice](https://www.researchgate.net/publication/Contributions_of_Neuroscience_Knowledge_to_Teachers_and_Their_Practice)
9. Patricia K Kuhl/ Early Language Learning and Literacy: Neuroscience Implications for Education/September 2011
10. Friederici, A. D. (2011). The brain basis of language processing: From structure to function. *Physiological Reviews*, 91(4), 1357–1392.
11. Immordino-Yang, M. H., & Damasio, A. (2007). We feel, therefore we learn: The relevance of affective and social neuroscience to education. *Mind, Brain, and Education*, 1(1), 3–10.