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Exploring Innovative Neuropedagogical Implications in English as a Foreign Language Teaching

Exploración de implicaciones neuropedagógicas innovadoras en la enseñanza del inglés como lengua extranjera

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Abstract

This literature review takes a semi-systematic approach to explore new neuropedagogical insights for teaching English as a Foreign Language. It investigates how integrating neuropedagogy with technology can improve motivation, inspiration, and learning outcomes in language education. The research covers literature from 2000 to 2024, identifying trends, challenges, and advancements in this field within the context of EFL teaching. The review includes studies that demonstrate the positive impact of incorporating principles such as personalized learning, neuroplasticity, and cognitive psychology into language instruction. Results show a strong link between neuropedagogical approaches and increased student motivation, engagement, and language proficiency. Additionally, using technology tools in language learning environments aids adaptive learning methodologies personalized feedback, and interactive experiences. This review emphasizes the importance of implementing innovative neuropedagogical strategies alongside technological advances for dynamic and effective EFL teaching practices. A combination of neuroscience-informed pedagogy along with digital tools shows potential for optimizing language learning environments, fostering student-centered learning, and enhancing linguistic proficiency among EFL learners.

Keywords: neuropedagogy; neuroeducation; brain-based-learning; neuroscience; neuropsychology.

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Resumen

Esta revisión bibliográfica adopta un enfoque semisistemático para explorar nuevas perspectivas neuropedagógicas para la enseñanza del inglés como lengua extranjera. Investiga cómo la integración de la neuropedagogía con la tecnología puede mejorar la motivación, la inspiración y los resultados del aprendizaje en la enseñanza de idiomas. La investigación cubre la literatura desde 2000 hasta 2024, identificando tendencias, retos y avances en este campo dentro del contexto de la enseñanza del inglés como lengua extranjera. La revisión incluye estudios que demuestran el impacto positivo de la incorporación de principios como el aprendizaje personalizado, la neuroplasticidad y la psicología cognitiva en la enseñanza de idiomas. Los resultados muestran una estrecha relación entre los enfoques neuropedagógicos y el aumento de la motivación, el compromiso y la competencia lingüística de los estudiantes. Además, el uso de herramientas tecnológicas en los entornos de aprendizaje de idiomas favorece las metodologías de aprendizaje adaptativo, la retroalimentación personalizada y las experiencias interactivas. Esta revisión subraya la importancia de aplicar estrategias neuropedagógicas innovadoras junto con los avances tecnológicos para lograr prácticas de enseñanza de EFL dinámicas y eficaces. La combinación de la pedagogía basada en la neurociencia y las herramientas digitales muestra su potencial para optimizar los entornos de aprendizaje de idiomas, fomentar el aprendizaje centrado en el alumno y mejorar la competencia lingüística de los estudiantes de EFL.

Palabras clave: neuropedagogía; neuroeducación; aprendizaje basado en el cerebro; neurociencia; neuropsicología.

Introduction

Language learning is the pinnacle of evolution for humankind. From the earliest form of communication through grunts and gestures to the complex systems of language there is today, the ability to learn and use language has been fundamental to our survival and development as a species. Language learning has always been hand in hand with the most advanced technologies of the time (Alemi, 2016).

Neuropedagogy embraces the concept that every opportunity to teach is an opportunity to learn how to teach better. This means that every interaction with a student, no matter how it is acted upon, is informing teaching. This perspective brings forth the idea that students are not the only ones who are learning. Teachers are continually reconstructing their own understanding of material or their own personal skills by teaching. To understand how to cater to a student's needs better, teachers can appeal to their past and current teaching experiences to learn how to come up with more effective outcomes. Since learning is an interdisciplinary event, everything that is being taught can have implications to promote or discourage learning and also motivation in students. Understanding this can further enable teachers to identify students who are struggling to learn and come up with innovative teaching strategies for those students such as Artificial Intelligence which is helpful but also at a certain point (Grassini, 2023; Foley, 2020; Sablic et al., 2021).

Theoretical framework

Background of Neuropedagogy

The roots of Neuropedagogy go back to the late 20th century, and advancements in the field since then have significantly changed how the brain is understood. Researchers and educators began to see the advantages of combining aspects of neuroscience and education as they gained a better understanding of how the brain affects the student's learning, thinking, and behavior. This discovery has had a major impact on education nowadays (Jolles & Jolles, 2021).

The scientific background of this term stems from the growing body of evidence suggesting that understanding the neurobiological mechanisms of learning and memory can inform effective teaching practices. Modern neuroscience research has produced significant insights about the brain and its functioning, thus making an impact on how teachers may approach their learners (Beauchamp & Beauchamp, 2012).

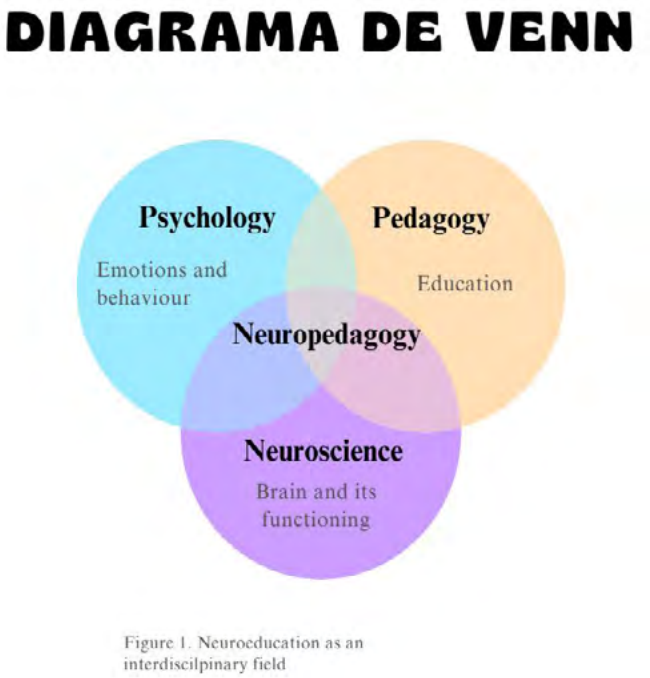
Neuropedagogy can be traced back to the contributions of researchers such as Luria, Moskvin & Moskvina, and other scholars who expanded on Luria's ideas, according to Gvozdii et al. (2022). These pioneers laid the foundation for studying the relationship between the brain and education, examining how neural processes impact learning outcomes. They emphasized the importance of considering the brain as the central organ in the learning process and recognized that educational practices should be designed in accordance with neural functioning. In the field of English as a foreign language teaching, neuropedagogy offers valuable insights and strategies for optimizing language learning (Pulvermüller & Schumann, 1994) (See Figure 1).

Definition of Neuropedagogy

Neuropedagogy represents the intersection of neuroscience, teaching methods, education theory, pedagogy, and psychology. It seeks to develop principles and suggestions for enhancing learning based on discoveries in brain research. It aims to bridge the gap between scientific research on the brain and educational practices, utilizing insights from neuroscience to inform teaching strategies and pedagogical approaches (Gvozdii et al., 2022; Vovk et al., 2022).

This novel approach to learning, referred to as "neurodidactics" or "neuropedagogy," which focuses on brain-based instruction techniques, has sparked debate in Europe recently. The terms neurodidactics, neuropedagogy, brain-based or brain compatible learning and teaching share similar definitions as they all focus on the importance of understanding the brain and its role in education globally (Trníková & Petlák, 2012) (See figure 1).

Figure 1. Neuroeducation as an interdisciplinary field.



Own sources.

Neuropedagoy and motivation

Motivation is one the areas that Neuropedagoy focuses in by understanding student motivation and how it impacts language learning. Researchers have found that motivation plays a significant role in language acquisition, as it affects students' engagement, effort, and persistence in learning a new language. Some studies have shown that certain teaching strategies, such as incorporating real-world examples and providing opportunities for self-expression, can enhance motivation and increase language learning outcomes (Arkhipova et al., 2015; Peng, 2022).

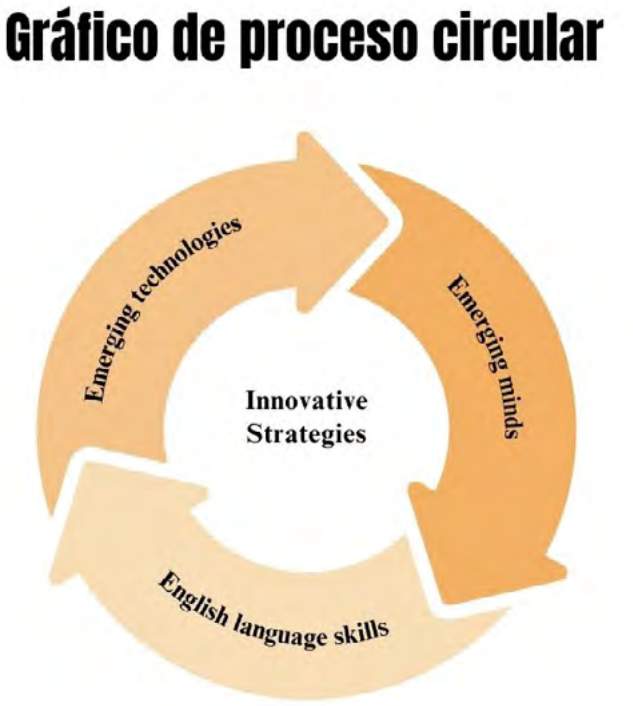
It is important for educators to investigate for themselves and innovate ways to create an environment that fosters intrinsic motivation, where students are internally motivated to engage with the provided material and take ownership of their learning (Anjomshoa & Sadighi, 2015).

Language Skills and Innovative Strategies

Learning skills with neuropedagogy can be enhanced through innovative teaching methods that integrate neuroscience findings. These methods can include multisensory activities, such as visual flashcards as visual stimuli, learning through music or storytelling as auditory stimuli, and dancing as kinesthetic stimuli; incorporating these into language lessons to engage multiple areas of the brain and enhance language acquisition would provide better student learning outcomes (Pulvermüller & Schumann, 1994).

Another approach is the use of technology, which nowadays is trending in every aspect of a person's life, through computer-based language learning programs, apps, games or virtual reality simulations, creates more interactive and immersive language learning environments that are more interactive and immersive. These approaches can provide students with a more engaging and personalized learning experience, allowing them to practice and apply language skills in real-life contexts having multisensorial stimuli (Repetto, 2014) (See Figure 2)

Figure 2. Fundamental language skills (reading, writing, listening and speaking) interacting with emerging technologies and minds providing innovative strategies.



Own sources.

Meaningful learning helps people remember and retain information better, so instructors may use real-life examples to appeal to different types of learners and their own styles. This includes using visuals and hands-on activities, different multisensorial stimuli to enhance understanding. Additionally, integrating technology in language teaching has shown promising results in improving student engagement and motivation, as well as enhancing their language skills (Shadiev & Yang, 2020).

The use of tech tools in English language classrooms can greatly improve the education process by providing interactive and personalized learning experiences, fostering collaboration among students, and allowing for authentic language use. Moreover, technology integration offers a range of resources that support tailored instruction catered to diverse learner needs, helping them retaining information better by associating what they learn with aspects of their interests This is considered part of brain-based learning which integrates these psychological elements (Abdolmaleki & Saeedi, 2024).

Furthermore, Neuropedagogy also emphasizes the importance of creating a positive and supportive learning environment. Teachers can foster a positive classroom climate by promoting collaboration, providing constructive feedback, and recognizing student efforts and achievements. With the integration of Neuropedagogy into English as a foreign language teaching, teachers can enhance student learning skills by utilizing innovative teaching methods that are grounded in neuroscience research and cater to individual learner needs (Li & Jeong, 2020).

Within this context, this literature review investigates the integration of neuropedagogical principles into English as a Foreign Language (EFL) teaching. Therefore, the purpose of this review is to fill this gap by revising existing literature, synthesizing key findings, and providing recommendations for future research and practice in the field of EFL teaching combined with Neuropedagogy.

Research questions

How is motivation connected to Neuropedagogy in learning English as Foreign Language learning (EFL)?

How do neuropedagogical principles applied in the EFL classroom impact language learning skills?

What are the results associated with integrating neuropedagogy into EFL instruction?

Methods

This article is a semi systematic review that provides a middle ground between the strict methodology of a systematic review and the more adaptable approach of a narrative review. It's especially valuable for conducting thorough literature reviews while considering real-world limitations (Sampaio & Mancini, 2007).

This article gathers various sources and search engines to provide an approximate investigation such as ERIC (Education Resources Information Center), Taylor & Francis Online, Scopus. These databases were selected because they cover a wide range of disciplines relevant to education, psychology, neuroscience, and linguistics. Google Scholar was also used to supplement the database searches and ensure comprehensive coverage of relevant literature.

This review included quantitative, qualitative, and mixed-methods studies, as well as theoretical and conceptual papers, empirical studies, research articles that provide insights into neuropedagogy and its application in EFL teaching.

A diverse range of journals were considered including those specializing in neuroscience, psychology, education, brain-based learning and related fields. While there were no specific journal exclusions, some journals with high impact factors and a focus on education or linguistics were given priority.

This research covered articles published from 2000 to 2024, which enables a comprehensive and current analysis of the field. It also helps with understanding historical context, trends, conducting comparative studies, showing impact evidence, and pinpointing research gaps and future directions. Table 1 shows the list of exclusion and inclusion criteria applied in the selection of the sample of articles for the review.

Table 1. Inclusion/exclusion criteria.

Criteria	Inclusion	Exclusion
Focus of the article	They should focus on the integration of neuropedagogical principles into EFL teaching practices. Articles that detail the neurocognitive process in language acquisition.	Articles that do not cover neuroeducation, neuropedagogy, neuropsychology. Articles that focus only on neurology and neuroimaging.
Publication date	2000 to 2024	Articles published prior to 2000
Publication type	Articles must be peer-reviewed and published in academic journals, scientific magazines.	Non-peer-reviewed sources, conference abstracts, book reviews, editorials, and opinion pieces will be excluded.
Language	English, Spanish	Other languages will not be included

Own sources.

The articles selected were carefully examined to find patterns and trends in the selected studies. Findings were organized based on the research questions and goals.

Eighty articles were selected at the start of the review, which was later reduced to 23 due to challenges with accessing certain virtual libraries and their paid content. The keywords established did not match the terminology of many articles. Some papers discuss aspects of neuropedagogy or psychology without explicitly mentioning them, so they were left out from this research. Other articles covered neuropedagogical aspects but were not connected to education, especially English teaching. Similarly, there were papers that explore new technologies in teaching unrelated to English instruction, so these were also excluded from this research focused on English teaching and learning.

Development

The results are organized in three sections, each of which has its corresponding findings with the main aspects to consider regarding innovative strategies for teaching English as a Foreign Language while integrating psychological aspects: motivation to learn, language learning skills, novel strategies as approaches.

Table 2 demonstrates the keywords associated with the research of the articles, and also shows the related terms within Neuropedagogy in the findings.

Table 2. Related Keywords.

Motivation	Language Learning Skills	Novel Strategies
Neuropedagogy Neuropsychology Education Neuroscience Emotions Motivation Education Neurodidactics Neuroeducation Brain Based Learning Neurolinguistic Programming Subconscious Mind Meta-cognitive Cognitive strategies	Neuropedagogy Language learning skills Language acquisition Cognitive profiles Learning styles Neurodidactics Education Neuroeducation Neuroscience Neuropsychology EFL Brain Based Methods	Meta-cognitive Cognitive strategies Language learning skills Technology Neuropedagogy Neuropsychology Neuropedagogycal models Neuroscience Cognitive Psychology Neuroeducation Virtual Reality Social media Gamification Podcasting EFL

Own sources.

Motivation to Learn:

Table 3 represents findings of authors who have examined aspects of Neuropedagoy related to student motivation in the educational process. Applications in classroom interventions like incorporating games, creating activities that mimic real life, and using technology. Neuropedagogical techniques work well in helping young learners develop their skills by engaging them in various activities that boost their motivation and classroom engagement. Teachers also play a crucial role in students' motivation to learn in the classroom, as it is their job to connect with each student and support their academic growth by creating interesting and rewarding learning experiences, as well as offering useful feedback.

Table 3. Prominent authors of studies examining motivation in learning.

Title	Authors	Type of study	Findings
Prisms of Neuroscience: Frameworks for Thinking About Educational Gamification	Serice, L.	2023 Research Article	Implementing gamification provides educators with new insights for creativity, education, and students' motivation
The Relationship between Neuropedagogic Approaches and the Formation of Skills of Primary School Students	Vasilieva, S., Reipolska, O., Podoliuk, S., Sadova, I., Danyliak, R., & Lozenko, A.	2023 Empirical study: survey	Neuropedagogical methods are effective for developing the skills of young learners by enhancing their motivation and interests in class.
Fostering EFL learners' motivation, anxiety, and self-efficacy through computer-assisted language learning- and mobile-assisted language learning-based instructions	Dong, L., Jamal Mohammed, S., Ahmed Abdel-Al Ibrahim, K., & Rezai, A.	2022 Empirical study: survey	Mobile and computer technology in language learning can increase motivation, reduce anxiety, and boost confidence by engaging learners in real-life activities and interactive experiences.
Educational Needs of Society: Neuropedagogy as One of the Main Aspects of Motivation in Learning within Formal and Non-Formal Education	Kaplinskiy, V., Voloshyn, S., Stakhiv, L., Oleksyuk, O., Ruskulis, L., & Haidaienko, I.	2022 Empirical study: survey	The way students think shapes how we plan educational activities in neuropedagogy, and understanding their motivation is key to their success.
Teaching English to the Rhythm of the Brain	Madua, A.J.	2022 Analytical Thesis	Teachers can boost students' motivation by making learning engaging and rewarding, along with providing helpful feedback.
A Systematic Review on Language Learning Strategies for Speaking Skills in a New Learning Environment	Livan, K., & Md, M.	2021 Literature review	Learners who use meta-cognitive strategies are often highly motivated and have better control over their own learning, becoming more self-sufficient and independent in their language learning journey.
Neurodidactics and its utilization in the field of language teaching	Moravcová, Ľ., & Maďarová, Ľ.	2016 Research Article	Neurodidactics offers a new way to teach language by focusing on the learner's motivation and personality to acquire foreign language skills.

Own sources.

Language Learning Skills:

Table 4 summarizes reviews cognitive aspects that were implemented in the acquisition of language learning skills. Based on the findings listed in the table, matching students' interests in classrooms through social situations seems to be the predominant form of applying neuropedagogical principles in EFL. This approach aligns with the idea that engaging students' interests can enhance learning outcomes and create more meaningful educational experiences.

Table 4. Language Learning Skills.

Title	Authors	Type of Study	Findings
Brain-based CALL in flipped higher education GE courses held through LMS: Boosting vocabulary learning and reading comprehension	Abdolmaleki, N., & Saeedi, Z.	2024 Experimental Study	Undergraduate students experienced pre-tests and post-tests of traditional methods moved to online courses to support their learning by incorporating their individual learning styles and interests
Neuropedagogical Approach Enhancing Foreign Language Acquisition in Non-Linguistic Higher Education Institutions	Никипорець, С., Мельник, О., Дерун, В., Гадайчук, Н., & Чопляк, В.	2023 Empirical Study	Neuroscience-based teaching methods have significantly improved language skills for students at non-language-focused colleges, demonstrating the effectiveness of brain-aligned approaches in foreign language acquisition. Both students and teachers are enthusiastic about these interventions and their ability to personalize learning for individuals.
Empowering language learning: the impact of TED talks on listening skills and beyond	Komekova, A.	2023 Theaoretical research	Using TED Talks in the classroom can improve students' listening skills and language abilities, making learning more interesting and effective. The thinking process is important for structuring educational activities in neuropedagogy.
Neuropedagogy: A Concept of Brain Compatible Teaching a Foreign Language	Vovk, O., Zenya, L., & Brovarska, I.	2022 Article	Neuropedagogy offers a new approach to teaching and learning, providing educators with insights into supporting students' cognitive development to enhance language acquisition.
A Neurodidactic Model for Teaching Elementary EFL Students in a College Context	Barbosa, E.Y.	2021 Empirical Study	A neurodidactic model for college students combines neuroscience, learning theories, and EFL pedagogy to address challenges in achieving specific learning goals.
A Systematic Review on Language Learning Strategies for Speaking Skills in a New Learning Environment	Livan, K., & Md, M.	2021 Literature review	Using social situations as a learning strategy helps learners become more confident and vocal in practicing English
The Use of Virtual Reality for Language Investigation and Learning	Repetto, C.	2014 Opinion article	Neuroscientific knowledge and advanced technology can enhance language skills through the use of multisensory stimuli in Virtual Reality

Own sources.

Novel Strategies:

Table 5 presents studies that have integrated neuropedogycal principles with novel strategies into the English learning process. The findings show that leveraging neuropedagogical principles to identify students' strengths and weaknesses allows for the effective use of different modern technology tools to support and enhance student learning. Although, Gvozdii et al. (2022), shows that new advancements in technology can be beneficial, but it's important not to rely on them too heavily. An excessive amount of virtual reality and multisensory stimulation could have a dehumanizing effect on students.

Table 5. Novel Strategies.

Title	Authors	Type of Study	Findings
Brain-based CALL in flipped higher education GE courses held through LMS: Boosting vocabulary learning and reading comprehension	Abdolmaleki, N., & Saeedi, Z.	2024 Experimental Study	The combination of students' cognitive abilities and online teaching methods has affected university undergraduates, enabling them to engage in learning activities aligned with their interests.
Empowering language learning: the impact of TED talks on listening skills and beyond	Komekova, A.	2023 Theaoretical research	Incorporating TED Talks in language learning can enhance students' skills, promote independent study, and inspire them to explore new ideas.
Prisms of Neuroscience: Frameworks for Thinking About Educational Gamification	Serice, L.	2023 Research Article	This article discusses how technology is viewed as an expansion of cognition and highlights gamification as a key tool for educators to build knowledge with students.
Neuropedagogy in Contemporary Formal and Non-Formal Education	Gvozdii, S., Bakhov, I., Pienov, V., Palamarchuk, S., Dudnyk, N., & Petrukhan-Shcherbakova, L.	2022 Research Article	Neuropedagogical principles can be effective in education when applied appropriately. While new technologies can be beneficial, over-reliance on virtual reality and multisensory stimuli may dehumanize students.
Teaching English to the Rhythm of the Brain	Madua, A.J.	2022 Analytical Thesis	Insights from neuroscience can include storytelling, games, hands-on activities that engage the senses, social interactions, physical movement during learning sessions, and visual aids like mind-maps and graphs.

Title	Authors	Type of Study	Findings
A Systematic Review on Language Learning Strategies for Speaking Skills in a New Learning Environment	Livan, K., & Md, M.	2021 Literature review	The study examined how students are adjusting to technological advancements, offering valuable insights for educators seeking to enhance online teaching methods.
The social brain of language: grounding second language learning in social interaction	Li, P., & Jeong, H.	2020 Review article	The study proposes a method that focuses on linking language learning with social interaction, where learners participate in real-life or simulated scenarios to engage with people and objects using virtual reality for more immersive learning and communication.
The Use of Virtual Reality for Language Investigation and Learning	Repetto, C.	2014 Opinion article	Neuroscience and advanced technology can enhance language learning skills through the use of multisensory stimuli in Virtual Reality.
The role of metacognitive listening strategies awareness and podcast-use readiness in using podcasting for learning English as a foreign language	Rahimi, M., & Katal, M.	2012 Research Article	Students can learn to use their cognitive resources to improve their language learning with the help of technology, e-learning programs, tech tools, online learning environments, and podcasting.

Own sources.

Conclusion

The 23 articles included in this review examined the impact of applying neuropedagogical principles in the field of EFL teaching and their impact on motivation and language skills, as well as novel strategies used in classrooms. Insights gained from the literature on the topic can be applied to provide answers to the research questions posed at the start of the review.

How is motivation connected to elements of neuropedagogy in English learning?

There are seven primordial articles that show the implementation of Neuropedagogical aspects regarding students' motivation during the learning process.

Studies suggest that the thinking process of the learner becomes a foundation for structuring educational activities. Becoming familiar with their learning process, interests and what draws their attention, can foster higher motivating and better control of their own learning process.

Learners' motivation can be boosted by implementing activities and performing tasks that interest them. Educators could creatively provide insights to help students to get to know themselves and find a better learning path.

This shows that the integration of psychology, neuroscience and education can help accomplish the understanding of each student educational needs to enhance a better engagement to the learning process. Authors have described neuropedagogycal aspects in classroom by getting to know each students' capabilities, necessities and personalities to create a more soothing learning environment free of stress and different elements that don't allow students to have the liberty to express themselves and learn at their own pace.

How do neuropedagogical principles applied in the EFL classroom impact language learning skills?

The findings of seven articles including elements of psychology, neuroscience, and education have been implemented together in different perspectives to create or to adapt learning methods, approaches and models of programs that brings better outcomes in improving or acquiring language skills such as listening, speaking, reading and writing.

Neuropedagogical approaches help teachers understand students' individual needs and tailor their teaching methods accordingly. Educators can combine traditional techniques to online learning, enhancing language acquisition by aligning new material with students' unique learning styles and interests.

Authors have presented various methods that help each student acquire information through different innovative multisensorial activities, making it easier and stress free to learn a language. Neurodidactic elements combine neuroscience, learning theories, and EFL teaching, to tackle the challenges that teachers encounter when aiming for specific learning goals.

What are the results associated with integrating neuropedagogy into EFL instruction?

All nine articles linked to the mentioned keywords referring Neuropedagogy ahowed that with the technology given nowadays, there can be improvements in different language areas.

Nowadays learners are adapting rapidly to technological changes, providing insights for their educators to improve online teaching. The use of apps, programs and Artificial Intelligence helps students learn faster by searching topics of their interest. Another element used these days is Virtual Reality, which provides real-life scenarios for students to practice communication skills. This encourages students to continue learning, as they are innovative technologies that cater to every aspect of education motivating students to continue learning.

Some articles show proposals of improving language acquisition with strategies that are not so novel, yet when combining them with today's technology, may have better outcomes achieving improvements in student motivation and language acquisition.

Gvozdii et al. (2022), stated that Neuropedagogical principles can work well in education, if they are used at the right time for the right situations. Even if new technologies help educators find better ways for students to learn, these technologies shouldn't be absolutized because too much virtual reality, too much multisensorial stimuli could dehumanize students, as this is also an issue presented worldwide.

In summary, neuropedagogical concepts are connected to students' drive to improve their learning experience, customized to their individual needs and interests. This in turn helps them acquire language skills more effectively. Nowadays, new technology plays a significant role in promoting learning; it offers an innovative way for students to access information on the internet and keeps them engaged with the latest updates. However, Gvozdii et al. (2022), state that there is also a risk of dehumanization as artificial intelligence replaces some aspects of traditional learning. Therefore, it is crucial for educators to embrace neuroeducational principles to understand their students better and regulate the use of technology appropriately for everyone's benefit – both in teaching and learning – thus creating improved educational settings.

A considerable amount of information could not be directly found using the word Neuropedagogy. As this is a new area of study, not many articles contained this specific keyword. Instead, the literature had some additional terms that fell into the areas within Neuropedagogy and helped with the understanding of the connection between psychology and education.

Future lines of research:

Further research is recommended to investigate the effectiveness of various brain-based teaching strategies that could help determine the optimal combination of most of the existing methods for different learner profiles, language levels, and educational contexts.

The topic of the impact of educator training in neuropedagogy and student outcomes would provide more information on the potential benefits of integrating neuropedagogical principles into teacher development programs. It would also explore the direct effects of the educator knowledge and application of neuropedagogy on student learning outcomes.

Researching the possible impact of social, cultural, age-related, or linguistic factors on how well neuropedagogical interventions work could help us understand better ways to teach diverse groups of learners. It recognizes that students have different traits and may react in various ways to neuropedagogical methods. Also, this review shows how essential it is for educators to keep learning and growing professionally so they can use neuropedagogical approaches effectively when teaching English as a foreign language.

Research on how technology can improve neuropedagogical approaches through language learning apps or virtual reality could offer valuable insights into the future of foreign language education by revealing the benefits and challenges of integrating technology and exploring new ways to enhance language learning outcomes.

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