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Empowering vocabulary acquisition in Cuban Higher Education Teacher Training: A Neurodidactic Corpus-Based Framework

Potenciación de la adquisición de vocabulario en la formación de profesores de Educación Superior en Cuba: Un marco neurodidáctico basado en corpus

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Abstract

This study focuses on the analysis of the data collected in seven Cuban universities, with the objective of assessing the relevance of a neurodidactic corpus-based methodology to be integrated in the methodological training of English language teacher educators in Cuban higher education. The present study employs a mixed methods approach, incorporating qualitative and quantitative data collection techniques. Data collection was necessary to test the hypothesis that neurodidactic principles and corpora are barely employed by teachers in Cuban Higher Education. The findings of the fieldwork suggest that there is scarce methodological preparation of teacher educators towards the use of authentic databases in English and in-depth knowledge in neurodidactic principles to enhance vocabulary acquisition. The results obtained from the study provide robust evidence that validates the initial hypothesis and underscores the necessity of incorporating neurodidactic corpus-based methodologies.

Keywords: Higher education, meaningful learning, neurodidactic corpus-based learning, teacher training, teacher trainees

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Resumen

Este estudio se centra en el análisis de los datos recogidos en siete universidades cubanas, con el objetivo de valorar la necesidad de incorporar una metodología neurodidáctica basada en corpus en la formación metodológica de los formadores de profesores de inglés en la educación superior cubana. El presente estudio emplea un enfoque de métodos mixtos, incorporando técnicas de recolección de datos tanto cualitativas como cuantitativas. La recolección de datos fue necesaria para comprobar la hipótesis de que los principios neurodidácticos y los corpus son escasamente empleados por los profesores de la Educación Superior Cubana. Los hallazgos del trabajo de campo sugieren que existe escasa preparación metodológica de los formadores de docentes hacia el uso de bases de datos auténticas en inglés y profundización en los principios neurodidácticos para potenciar la adquisición de vocabulario. La fundamentación y los resultados obtenidos de la recolección de datos sobre la metodología basada en corpus neurodidácticos en este estudio han demostrado ser válidos y necesarios.

Palabras clave: Aprendizaje neurodidáctico basado en corpus, aprendizaje significativo, educación superior, preparación de profesores, maestros en formación

Introduction

In the field of language education, the acquisition of vocabulary represents a crucial component of linguistic proficiency, despite the challenges it imposes on both learners and educators (Abdushukurova, 2024).

> In this concern, The Ministry of Higher Education aims to improve the teaching process of English in Cuban universities, recognizing the need to reform this process in order to achieve a higher quality of English language proficiency among graduates. Consequently, this will have a greater impact on the socio-economic and cultural development of the country and its relations with other nations (MES, 2017, p. 5.).

On the other hand, Cuban higher education is facing concerns with teacher trainees' vocabulary acquisition. As per national educational policies, by the end of their first two years of study, students are expected to have developed the ability to conduct research, engage in disciplinary

discourses, comprehend academic texts, and produce written work that aligns with the discourse of their respective fields (*República de Cuba Ministerio de Educación Superior plan de estudio carrera Licenciatura en Educación. Lenguas Extranjeras*, 2016).

It is evident that this constitutes the desired state. "Therefore, in order to enhance the quality of the preparation of future professionals in developing linguistic competence in the English language, scholars and researchers have pursued the improvement of its teaching and learning. Among them are Díaz et al. (2010), González (2015), Smith (2016), Beltrán (2017), Rey (2018), Fontes et al. (2020), Quintero et al. (2021), and Pérez et al. (2023)" (Delgado-Fernández & Puerto-Valdés, 2024, p. 22). "Although this topic has been extensively examined by the academic community, some limitations still remain in the teaching of English as a foreign language in higher education, with regards to both non-philologist and philologist profiles" (Delgado-Fernández & Puerto-Valdés, 2024, p. 22).

The difficulties experienced in attaining linguistic accuracy can be largely attributed to two fundamental factors: The first issue pertains to a deficiency in the vocabulary used, which hinders effective communication across different professional contexts. The second issue is lack of understanding of the grammatical structures required to express communicative intent (Castillo et al., 2023). On the other hand, "There are limitations in the planning, design, and implementation of various activities and teaching materials integrating technological and pedagogical skills; this could favor the exposure to authentic electronic databases (corpora), to gain literacy in using technology, and to enhance autonomous and independent learning" (Reyes Suárez & Arhire, 2025, p. 8).

In addition, there is a considerable absence of studies focusing specifically on vocabulary acquisition for teacher trainees in the Foreign Languages major within Cuban Higher Education (Enriquez, 2024a). This gap indicates a necessity for innovative methodologies that incorporate neurodidactic principles to optimize vocabulary learning. A neurodidactic-based teaching approach has the potential to offer an innovative solution by placing students at the center of the learning process, promoting active engagement, and emphasizing vocabulary acquisition by integrating the four language skills in a structured manner to enhance linguistic and communicative competence (Enriquez, 2024a). Furthermore, the growing interest in Cuba in

exploring new methods that combine technological competencies with innovative teaching strategies is present nowadays (Carr, 2024).

Within recent studies, Suarez (2024) has proposed a series of contrastive analysis activities with the objective of enhancing language acquisition. Research in corpus linguistics in Cuba remains limited though. Nevertheless, noteworthy contributions have been made by Abreu & Beatriz (2018), who developed the *Habana Corpus, Español Coloquial* (Hab.Es.Co), a resource designed to facilitate systematic and synchronic studies of linguistic phenomena with a pan-Hispanic scope.

On the other hand, the global focus on linguistic corpora has prompted numerous academics to delve deeper into the investigation of this discipline, thereby demonstrating the efficacy of its implementation. A substantial volume of research has been dedicated to the investigation of the practical, theoretical and methodological aspects of linguistic corpora, as well as the discussion of the tools employed in their analysis (Leech, 1991; McEnery, 2019; Biber, 2020). Corpus analysis has been demonstrated to offer a more accurate comprehension of a language than intuitiveness; however, its utilization within the domain of foreign language instruction remains limited (Başal et al., 2024). In the contemporary era, characterized by the proliferation and widespread accessibility of instructional computer technological resources and affordances, linguistic corpora have become imbricated with this field, but without a robust theoretical framework to underpin the connections between these disciplines (Altameemi, 2024). In fact, an extensive review of the relevant literature revealed a positive correlation between the use of linguistic corpora and the neurodidactic principles. However, the review identified a paucity of research, to the best of the researchers' knowledge, that integrated these two fields for vocabulary acquisition in Cuban teacher trainees.

The primary objective of this study is to evaluate the necessity and feasibility of a neurodidactic corpus-based methodology for the training of English language teacher educators in Cuban higher education, and thus contribute to the training of professionals with a solid linguistic domain that will allow them not only to communicate accurately, but also to successfully accomplish their profession in different educational contexts, to the benefit of the Cuban educational system as a whole.

Development

Theoretical framework. Neurolearning in language teaching

Research on neuroeducation and neurodidactics is increasingly present in this arena. Authors such as Mora (2021), Lazaro Navacerrada & Mateos Sanchez (2018), Jesús C. Guillén (2014), Willis (2021), Gamo (2019), Howard-Jones (2014), Jensen (2000), del Río Grande et al. (2005), among others, have published a wealth of work to bring these advances to society over the past 10 years (Bueno & Fores, 2018).

Arwood (2010) defines neuroeducation as a collective discipline that combines neuroscience, cognitive psychology, and language theory. Notably, the inclusion of language in the neuroeducation model is novel. Despite the language being extensively researched by scholars and scientists for decades, its role in the neuroscience-cognitive psychology education relationship has often been ignored. Arwood (2010) argues that language plays a vital role in the triad *Neuroscience, Cognitive Psychology, and Language Theory*, as it represents thinking, which is crucial to the learning process.

Neurodidactics involves the strategic arrangement and enhancement of education, drawing upon an understanding of brain structure, sensory likings, variations in the brain, learning styles hemispheres, responses concerning stress, and diverse forms of retention. From another point of view, Neurodidactics refers to a comprehensive approach that enhances the utilization of human and educational assets by comprehending the brain functioning during the development of acquiring the contents and abilities. This field of study emerges from the fusion of educational neuroscience and the characteristics of specific subjects, whether they are disciplinary, interdisciplinary, or transdisciplinary in nature (Barbosa, 2021). Neurodidactics can also be defined as the practice of enhancing and structuring education by utilizing knowledge about the brain's structure, sensory preferences, hemispheric variations, learning styles, responses to stress, and various memory types. The neurodidactic approach integrates and links diverse elements of conventional learning from fresh viewpoints. Its primary emphasis is on instruction, the characteristics of learners, and the enthusiasm to acquire knowledge. It essentially involves the scientific organization of the educational process, incorporating the most up-to-date understanding of the human brain (Apakina et al, 2020).

Neuroeducation and neurodidactics are distinct concepts. Neuroeducation aims to establish a correlation between neuroscience and education by applying neuroscience knowledge to the field of education. On the other hand, the uniqueness of neurodidactics lies in its practical application within the teaching domain, specifically in implementing neuroscientific knowledge in the classroom. Building upon the ideas expressed by Muchiut et al. (2022), neurodidactics can be described as a discipline that combines insights from both neuroeducation and didactics. Its objective is to optimize teaching and learning processes by enhancing methods, strategies, and tools, thus contributing to the identification of the most effective approach to make pedagogical knowledge accessible in light of advancements in neuroscience and how the brain learns (Muchiut et al., 2022). Consequently, neurodidactics is closely linked to the concept of pupil premium (PP) as they both emphasize the possibilities offered by this emerging discipline, which can also be viewed as related to pedagogy and psychology.

Advances in neuroscience have facilitated a more profound comprehension of the mechanisms through which the brain processes learning and language acquisition (Gauvain, 2018; Hernandez et al., 2021). The integration of concepts from multiple disciplines is imperative to comprehend these phenomena, as substantiated by developmental science (Gauvain, 2018; Hernandez et al., 2021) and intersectionality (Collins & Bilge, 2016; Midby et al., 2020). In light of these developments, we propose a novel interdisciplinary theoretical framework for foreign language teaching and learning, underpinned by the postulates of Neurodidactics and Linguistics as described by Lucas-Oliva et al. (2022). It is so important to search in these fields for a better understanding of what and how teachers are going to design their practices because learning is a complex process that both conscious and unconscious factors can influence; to facilitate effective teaching, it is essential to understand the key aspects of the brain and memory. The hemispheres of the brain and their lobes perform specific functions, such as visual development (occipital), hearing, memory, and language processing (temporal, including the hippocampus and Wernicke' area).

Equally important, the brain exhibits a positive response to pleasant stimuli, which benefits the teaching-learning process. According to de La Barrera & Donolo (2009), there is a relationship between learning and the receptive attitude towards stimuli, leading to the

emission of neurotransmitters in various spheres of the brain. These neurotransmitters provisionally modify the functioning of different neural networks, promoting synapses and activating other neurons, thereby facilitating efficient information processing and inducing a sense of pleasure (Damasio, 2018; Willis, 2021).

Additionally, neurochemical systems such as dopamine, serotonin, norepinephrine, and acetylcholine play an important role in learning and memorizing. For instance, dopamine contributes to motivation in students, serotonin is associated with a positive emotional state, low levels of noradrenaline may be found in easily distracted students, and acetylcholine is present in bored learners during traditional lectures (Guillén, 2017). The dopamine role in pleasurable learning activities significantly enhances attention and consolidates long-term memory (Willis, 2010). In contrast, neurotransmitters such as noradrenaline and adrenaline are crucial for maintaining students' attention once information reaches the prefrontal lobes, where executive functions occur. (de la Barrera & Donolo 2009; Damasio, 2018; Willis, 2021). On the other hand, examples of practices that have been shown to stimulate dopamine release, include engaging in preferred physical activities, laughing, positive social interactions, accomplishing goals, completing tasks satisfactorily, receiving storytelling, acts of kindness, and being correct (Willis, 2010, 2021). When dopamine levels increase in the neocortex through these activities, it leads to increased analytical skills, concentration, creativity, and overall motivation, irrespective of the difficulty of the activity performed or the possibility of making mistakes (Damasio, 2018; Willis, 2021). This heightened dopamine secretion leads to the subsequent release of additional neurotransmitters like acetylcholine. This, in turn, improves attentiveness, memory, focus, and executive functions within the prefrontal cortex (Willis, 2010), as well as serotonin, which is associated with memory consolidation, homeostasis, relaxation, and contentment processes (Squire & Dede, 2015).

In addition, brain plasticity is fundamental to the cognitive process; it is the brain's ability to change its neural networks and make synaptic connections. This is how information is processed, and new knowledge is acquired (M. V. Campos et al., 2024). On the other hand, attention, as one of the fundamental pillars of the cognitive process, is responsible for prioritizing and sequencing appropriate responses promptly. It is a property of the nervous

system that controls both the body and the brain, allowing selective focus of consciousness by filtering out irrelevant stimuli and unwanted information. Attention requires a neurocognitive effort that precedes perception, intention, and action. It involves three key aspects: activation, selection, and control. Each of these aspects is linked to the functioning of different brain regions and different neurotransmitters. (Márquez, 2019).

Interestingly (1996), Goleman introduced the concept of emotional intelligence (EI) as a complement to intellectual quotient (IQ), arguing that it influences performance in life. He defined EI as the ability to self-motivate, persevere, control impulses, regulate mood, show empathy, and maintain hope, and emphasized its importance alongside academic intelligence. Goleman noted that academic intelligence alone is not enough to prepare individuals for life challenges and opportunities. He highlighted the interplay between the limbic system, neocortex, amygdala, and prefrontal lobes, and how their positive interaction enhances both emotional intelligence and intellectual capacity. He also questioned the reliability of IQ, grades, and aptitude tests as predictors of success, citing numerous exceptions to this view.

In view of the above, teachers must prioritize effective methods that are linked to the times and in line with their students' interests. Today's students are highly motivated by ICT, so teachers should sensibly design activities that encourage active engagement and participation among learners. With the constant evolution of technology, educators must stay informed about utilizing digital resources to improve teaching and learning experiences and put into practice their expertise in integrating these digital tools into lesson plans, ensuring alignment with successful teaching methods (Sim & Ismail, 2023).

In short, new horizons for educational innovation have emerged through learning methodologies that integrate perception and Information and Communication Technology (ICT). These approaches have significantly transformed teaching and learning processes, fostering more dynamic and effective educational experiences, as evidenced by the successful completion of academic programs (George Reyes, 2020).

Corpus linguistics and language learning

The principles of corpus linguistics have been around for almost a century, initiated by lexicographers or dictionary makers collecting language samples to define words accurately

since the late 19th century. Before the age of computers, these examples were stored on paper slips in cabinets. The arrival of computers led to the development of modern corpora, the first computer-based corpus being the Brown Corpus, created in 1964, which consisted of 500 fragments of American English manuscripts of about 2,000 words each, for a total of about 1 million words (García-Miguel Gallego, 2022). Today, corpora comprise hundreds of millions of words, and corpus linguistics significantly impacts second language research and teaching (Net, 2010). "Corpus-based approaches can provide a detailed description of interlanguage at different stages of development, thus providing information on the sources of variation in language use and the level of proficiency achieved by language learners" (Gablasova et al., 2017, p. 131).

According to McEnery & Gabrielatos (2006) a corpus is a collection of texts selected from spoken or written language, arranged by certain principles to exemplify samples of language usage matching standard or conventional linguistic criteria. There are different types of corpora (static and monitor, general and specialized, native and translated, native and learner, parallel, monolingual, and multilingual), each serving different research purposes and providing valuable insights and results. Among these, general monitor corpora are particularly fascinating because of their size and synchronicity, which enable them to reflect the totality of a given language. This makes them highly relevant to a wide range of researchers (Dazdarevic et al., 2015). There are plenty of corpora in different written languages covering various topics, such as MISCUSP, LSWEC, CHILDES, AWL, ANC, ICLE, SST, CBLP, CANCODE, CORDES, CREA, BSL, DGS, COLA, CLUVI, CORELE, CAES, PRESEEA, SACODEYL. Others are free like MICASE, BNC, BAWE, COCA, etc.

The importance of using corpora in the study and learning of languages is growing every day. They provide invaluable answers to our linguistic questions about word frequency, usage, and meaning. "We use corpus tools to consult large authentic, principled collections of electronically searchable texts to discover the patterns of language use across a wide variety of general and specific registers so that we can better understand (and possibly teach) these patterns" (Crosthwaite & Baisa, 2023). In addition, by using corpora, teachers can improve their awareness and language competence, broaden their understanding of language use in

different contexts, and gain valuable insight into students' linguistic essentials and typical errors. In this way, teachers can make informed pedagogical decisions and develop effective teaching materials (Bennett, 2023). Additionally, corpora also provide a documented history of language development, allowing linguists to track changes in vocabulary, sentence structure, and usage over time. The study of historical corpora reveals linguistic patterns and provides insight into how language evolves in response to social change. Corpora are also valuable for exploring variations in language use across regions and social groups, as they provide insight into different communicative practices within communities (O'g'li, 2024).

The acquisition of corpus literacy skills has emerged as a pivotal aspect in the ongoing professional development of foreign language teachers, with the objective of updating their repertoire of instructional methodologies (Başal et al., 2024). Additionally, as is well documented, the use of corpora has expanded from their initial application in lexicography to encompass grammatical description of the English language, as well as a variety of other fields, including curriculum design, the creation of reference tools and the instruction of grammar in the classroom (Meunier, 2002; 2010; Oghigian & Chujo; Cheng, 2010; Hughes, 2012; Dilay & Dilai, 2016; Tribble & Wingate, 2013 in Roslim et al., 2020). Another contribution in the field was provided by Leech et al. (2014), who investigated on corpus-based approach to English grammar and vocabulary.

In another vein of information, Reppen (2008) sets out the principal research queries that may be investigated through corpus analysis, focusing on the usage of specific linguistic features, namely: a single word, a set of related words, a grammatical construction, or the interaction between particular words and grammatical structures. Furthermore, a considerable number of studies have been conducted in the field of corpus linguistics on the subject of prepositions. These studies have been undertaken from a variety of perspectives, with a particular focus on collocation and frequency information (Roslim & Mukundan, 2011). Although these studies have been very useful to develop abilities in any language, the primary lexical item of interest is designated as a 'keyword'. A variety of approaches exist for the manifestation of these keywords. Within the domain of corpus linguistics, a predominant methodology involves the utilization of keywords within a contextual framework, known as keyword in context (KWIC)

(Safii et al., 2021). Paying close attention to meaning in context has been demonstrated to be an effective strategy for reducing the emphasis on learning word forms (Elgort et al., 2016). The utilization of keywords as a mnemonic device to facilitate the acquisition of vocabulary has been a subject of extensive research, with over sixty studies focusing on this particular method. This approach incorporates both linguistic and visual components to enhance the retention of information (P. Nation, 2024).

In another vein of information, corpus linguistics has been presented as a technological tool with great potential for teaching, although its implementation in higher education institutions remains limited and underexplored (Dazdarevic et al., 2015). Incorporating corpora and related tools directly into the classroom supports theories and approaches to language teaching that promote learner autonomy, use realia and authentic texts, encourage student-computer interaction, and explicitly teach linguistic patterns and features (Friginal et al., 2020).

Helping students discover language rules inductively from authentic data has been challenging for English teachers in recent years, as traditional tools and intuition often fall short. Corpus linguistics fills this gap by enabling both teachers and students to effectively analyze natural language patterns and usage. Teachers can create corpus-based activities tailored to different proficiency levels, increasing student engagement and autonomy. For students, the use of corpora offers a faster and more efficient alternative to traditional methods such as dictionaries, encouraging hands-on learning and exploration of authentic examples. This approach not only diversifies classroom activities but also promotes active, student-centered learning, stimulating interest and independence in language acquisition (Ma & Mei, 2021). A key advantage of corpus-based language learning is its ability to improve vocabulary acquisition, a fundamental component of language learning. Traditional methods such as memorizing word lists are often less effective (Cobb, 2007). By examining words in context, learners gain a deeper understanding of how they are used in different situations, fostering a more nuanced understanding of language (Nation, 2022). Furthermore, corpus-based learning allows learners to focus on vocabulary relevant to their specific needs and interests, thereby increasing motivation and engagement in the language-learning process (Pulatova Durdona Ravshanovna, 2023).

Corpora are also precious for identifying common collocations and idiomatic expressions, which play a crucial role in improving learners' vocabulary and language use. This approach helps learners to communicate more fluently and naturally in the target language, thereby improving overall language proficiency. By studying language data, learners can identify their strengths and weaknesses in language use. This analysis enables the development of personalized learning activities that address the individual needs and interests of each learner, thereby increasing the effectiveness of the language learning process (Pulatova Durdona Ravshanovna, 2023).

At present, it can be stated that the limited implementation of linguistic corpora in teacher training programs in Cuba is not only a limitation of a poor country. Suarez (2024) asserted, that in Cuba teacher educators continue to face limitations, mostly with regard to their readiness to incorporate technology and electronic corpus tools into English language teaching and the teacher training process. A similar situation is observed in emerging economies such as Türkiye, where studies have examined the integration of corpus literacy into the teacher education curriculum (Özbay, 2017; Şimşek, 2020; ÇALIŞKAN & KÖRÜ Gönen, 2018; (in Başal et al., 2024). Despite this concern, research concerning in-service teachers' insights on the incorporation of corpus use in their pedagogical practices remains limited (Başal et al., 2024).

Particular attention should be given to language corpora, which have gained considerable popularity and interest in recent decades. Researchers define a corpus as a large collection of authentic language examples stored electronically. Their integration into classroom activities has transformed the teaching process, making corpus-based pedagogy highly effective and widely used (Tvaltvadze & Gvelesiani, 2023).

Methodology

This research was conducted in seven pedagogical universities in Cuba. A mixed methods approach was adopted for a comprehensive analysis, incorporating balanced strengths and weaknesses, and yielding consistent results. This serves to enhance confidence in the reliability, feasibility, authenticity, and representativeness of the results obtained, particularly in relation to the phenomenon under study (Todd, 2004).

The sample consisted of 93 teacher educators from different departments, namely Psychology, General Didactics and Foreign Languages, of seven pedagogical universities in Cuba: Ciego de Ávila, Santiago de Cuba, Camagüey, Santi Espíritus, Holguín, Pinar del Rio, and Matanzas. Due to the multidisciplinary nature of neurodidactics, the fieldwork was conducted in all the related disciplines. This included interviews with Psychology professors, General Didactics professors, and English language teachers. The selection for the interviews was made by means of the deliberate, critical or judgement sampling method. Besides, the teachers were selected for their substantial experience in the specific conceptual object of the investigation. Therefore, the specific requirements have been (i) their quality as psychology, general didactics or foreign languages teacher educator, with a title and position of (Associate or Full Professor); (ii) to have more than five years of experience in teaching didactics or in the field of linguistic studies and English teaching; (iii) to have scientific contributions related to the teaching of foreign languages, Didactics, or Psychology; (iv) to have taught courses on the teaching of the before-mentioned subjects.

To collect data, structured interviews were developed to assess teachers' opinions in four key areas: (i) their perceptions of neurodidactics and corpus linguistics, (ii) their impact on student engagement, (iii) their technological competence, and (iv) their willingness to integrate linguistic corpora and neurodidactic approaches into classroom practice.

Main findings and discussion

This section undertakes an exploration of the perceived value that teachers place on the capacity of corpora to provide authentic linguistic data, the ease of use of specialized digital platforms, and the impact of these practices on the interest and active participation of prospective teachers. The study also explores the extent to which the integration of these methodologies contributes to the enhancement of learning activities and the strengthening of students' engagement in the development of their lexical competence.

Teachers' perceptions towards neurodidactics corpus-based learning

The usefulness of incorporating linguistic corpora into classroom lessons completely depends on the teachers' perception of these resources and how they integrate them into their teaching practices. In this study, 93 teachers were interviewed about the potential of introducing

neurodidactics corpus-based activities into the teaching of English in Cuban Higher education to develop vocabulary acquisition in trainee teachers. The findings are further proven by accounts on teachers' technological competences, specifically their confidence and proficiency to use neurodidactics corpus-based methods in the classroom. The intention of using this new methodology is put forward as a strategy to increase engagement in the learning process by supporting students' vocabulary acquisition with authentic language data. In addition, the study explores teachers' willingness to experiment with corpus-based learning combined with didactic principles, specifically their receptiveness to its implementation.

Teachers' views towards corpus-based learning are essential to its implementation in the classroom. From the information collected it can be concluded that the teachers' opinions are divided. 41.5% of the teachers who took part in this study have a positive standpoint towards the use of linguistic corpora, as this approach presents significant potential for improving students' vocabulary acquisition and general language proficiency. One teacher remarked: "I have a feeling that it would be interesting for them because they would have authentic materials that are different from traditional texts, it could be a change in the way we teach; it is a special strategy to make our lessons more meaningful and authentic". On the contrary, 23.2% of teachers agree to the potential benefits of corpus-based learning but have a big concern about its practical implementation. They are confident about the benefits of the use of corpus linguistics, but at the same token express uncertainties about its application. Finally, 35.3% of teachers manifest doubts as regards their capability of efficiently integrating linguistic corpora into teaching practices. This lack of expertise may lead to queries about the potential impact of corpus-based features on student knowledge and classroom engagement.

Teachers' digital competence

Successful integration of linguistic corpora involves a certain level of ease and expertise with digital tools and language analysis platforms. Nonetheless, the data shows a significant gap in teachers' self-reported technological abilities. Only 16.2% of the respondents consider themselves to be highly proficient in the use of corpus-based tools, while 24.5% consider themselves to be moderately proficient. A notable 59.3% of respondents admit to having a low level of ability. This stresses the imperative need for professional development and training

programs to compensate for this technological gap, as a shortage of proficiency could impede the effective adoption of corpus-based approaches in the classroom. For example, one teacher mentioned: "I understand the potential of linguistic corpora, but I lack the confidence to use digital tools effectively." Another teacher expressed interest in the learning process, saying: "I do not know how these tools work, so I would probably need training." Such responses highlight the need for training programs to enable teachers to use corpus tools confidently.

Teacher's views on student engagement and methodology effectiveness

Another consideration closely linked to the combination of the neurodidactic principles and the use of corpus-based methods in learning is related to the means to strengthen student engagement. 65% of the teachers interviewed believe that this combination can improve students' engagement towards learning and the total classroom atmosphere. 24.7% of teachers appreciate fair changes in engagement and 10.3% see an insignificant impact. These findings indicate that, when used properly, the combination of neurodidactic principles and corpus-based learning has the potential to make teaching more interesting, dynamic, meaningful, and stimulating for students.

The most promising finding of this study is that teachers are appealed to try changes based on corpus-based methodologies. 72,8% of teachers communicated a positive attitude concerning experimenting with the combination of the neurodidactic principles and the use of linguistic corpora, indicating a robust disposition to adjust new methodologies that could improve teaching and learning. One teacher commented: "As teachers are somehow aware of some didactic principles, I'm eager to try corpus-based activities in the classroom. It seems a means to expose learners to real language use." 17.3% show some willingness to experiment, while 10.7% claim to prefer traditional methods, with one teacher stating: "I'm in favor of traditional methods because they have proven to be effective, and I am afraid that corpus-based learning might be too complex for students". This indicates that, beyond technological proficiency and awareness of linguistic corpora, most teachers are open to change and emerging practices in the classroom.

The general perception on the use of linguistic corpora by teachers of English in Cuba is therefore a combination of dilemma and optimism concerning their applicability to classroom

learning. Most of the interviewees consider corpus-based learning to be an efficient strategy for improving vocabulary acquisition and language learning in general, indicating an overall perception of its advantages. Additionally, it can be observed that teachers are willing to play a role in using corpus-based features in the classroom, as the disposition is quite high. Nevertheless, the research still reveals some concerns that represent some imperative needs that can be considered by program developers in the curricula of teacher trainees, and in turn in the departments, empowering teacher educators through methodological preparation of this new methodology to contribute to the didactic and linguistic upgrading of staff to fill this gap in the technological literacy of teachers. Future research should determine when and how to integrate language corpora in the most effective way, and how to respond to learners' needs and individualities in terms of vocabulary acquisition.

Conclusions

The main objective of this study was to evaluate the necessity and feasibility of a neurodidactic corpus-based methodology for the training of English language teacher educators in Cuban higher education. The present study offers a novel perspective on this matter for several reasons. Firstly, it is the first training experience that combines neurodidactic principles with the utilization of linguistic corpora to increase teacher trainees' vocabulary acquisition. Secondly, it aims to analyze how the implementation of neurodidactic principles increases students' motivation towards the acquisition of academic vocabulary.

The present study corroborates the hypothesis that the integration of neurodidactic principles with methodologies based on linguistic corpora constitutes a viable and promising way to optimize vocabulary acquisition in Cuban higher education teacher trainees. The results of the qualitative research, through the structured interview, revealed that the subjects of the study manifested a restricted lexical repertoire and difficulties in using vocabulary in real contexts. Furthermore, the perceptions of scholars revealed a widespread recognition of current limitations regarding the use of technology, mainly the domain of corpus linguistics. Moreover, in the field of linguistic research, a general consensus has been reached regarding the relevance of corpora as a source of authentic data. This unanimous recognition underscores the significance of corpora as essential instruments in the realm of linguistic research.

As future research is recommended, longitudinal studies based on linguistic corpora integrating neurodidactic principles, such as multisensory activation, attentional and emotional management, and spaced repetition with methodologies driven to lexical retention. This approach has been identified as a viable and promising option to optimize vocabulary acquisition by teacher trainees in Cuban higher education. In order to strengthen the evidence concerning this model, it is suggested that future research undertake the task of evaluating its effectiveness in contexts that exhibit similar characteristics to those of the Cuban reality. This comparative exercise would allow for the adjustment and replication of the strategies employed in analogous educational environments. This, in turn, would guarantee the transferability and applicability of the results in different contexts.

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