
Integrating Neurolinguistic Approaches in ELT: Overcoming Communication Barriers for Arab Learners

Fahd Mohammed Sagheer Eid

(PhD, MA, BA) Linguistics

Senior English Lecturer at different Yemeni universities

Abstract. The article explores how neurolinguistics, which is the study of how language and the brain are connected, can help improve English teaching for students who speak Arabic. Arabic-speaking students face a range of challenges when learning English, which are influenced by the structural and phonological differences between the two languages, as well as cultural and cognitive factors. Therefore, this study points out the differences in structure between Arabic and English and explains how knowing how the brain handles language can lead to better teaching techniques. By using knowledge from neurolinguistics along with language education, teachers can more effectively help Arabic learners, especially with pronunciation and practicing the language. The article provides strategies and examples based on research to help educators, and it stresses the importance of experienced teachers in overcoming challenges with pronunciation and language skills. Both descriptive and qualitative approaches are applied in this paper. There are findings listed in the conclusion section, in this study, indicate that neurolinguistics plays a significant role in enhancing English communication skills for Arabi students.

Keywords: Neurolinguistics, ELT, Communication Skills, Arabic-Speaking Students, Language Acquisition

Introduction

Definition and Scope of Neurolinguistics

Neurolinguistics is the study of how the brain handles and creates language. It looks at the brain processes involved in learning, understanding, and using language. This field combines knowledge from linguistics, neuroscience, psychology, and cognitive science (Bastiaanse & Thompson, 2012). By learning how the brain works with language, experts and teachers can create better ways to teach languages. In (ELT) teaching, neurolinguistics is very important for improving communication skills. This is basically helpful for students who learn English as a second language, where the mental effort is greater than when learning a first language. Neurolinguistics helps teachers understand which some parts of the brain are effectively involved in language learning, like the Broca's and Wernicke's areas, which control language speaking and understanding, respectively (Friederici, 2017). Garman (2014) mentioned that neurolinguistics helps us understand how our brains learn a second language. This knowledge can help teachers create better language learning programs.

Combining neurolinguistics with English language teaching can give teachers useful information about how students learn languages on a mental and brain level and this understanding helps teachers adjust their teaching to match how the brain naturally learns, which can improve how well students learn languages and how well they can communicate (Pulvermüller, 2005). For example, neurolinguistics shows that repeating and practicing are important for learning languages. Repeating things strengthens the connections in the brain, making it easier for students to remember and use new words and grammar. Dronkers & Ludy (1998) indicated that neurolinguistics stresses the importance of feedback and corrections in language learning. Giving quick and clear feedback helps students fix their language use and

avoid making the same mistakes over and over. In English language teaching (ELT), using neurolinguistic methods can be very helpful for Arabic-speaking students. These students often struggle with learning English because the languages and how we think in them are quite different (Lightbown & Spada, 2013). By using neurolinguistic ideas, teachers can create special lessons that help with these difficulties and improve students' communication skills.

Arabic-speaking students encounter various difficulties when learning English, mostly due to the structural differences between the two languages. Arabic is a Semitic language, while English is a Germanic language. These differences in language families impact how the brain processes both languages, making it harder for Arabic-speaking students to learn English. For instance, Arabic uses a root-based system to form words by adding prefixes and suffixes to a root. On the other hand, English uses a more straightforward system where words are created by combining prefixes, roots, and suffixes. This difference in word formation can be challenging for Arabic-speaking students to understand and use English vocabulary. Ibrahim (2009, p. 96) emphasized that "The interpretation of the difference between the patterns of priming within and across languages is that words in a second language have looser connections with their meanings than do words in the first language." Thus, the differences between Arabic and English cause significant challenges for Arabic-speaking students, both in thinking and in pronunciation. It's important to use teaching methods that help with these challenges at a deep level. Arabic and English have different sounds, which can be hard for students who speak Arabic. English has more vowel sounds than Arabic, and some English consonants, like /p/ and /v/, are not found in Arabic. This can cause pronunciation mistakes and make it harder to communicate (Ibrahim, 2014).

Purpose and Objectives of the Study

This study aims to understand how neurolinguistics can help Arabic-speaking students improve their English communication skills. This study focuses on how neurolinguistic principles can be used to address the difficulties that Arabic learners of English encounter.

The objectives of this research are:

- To examine the brain activities related to learning languages and improving communication skills.
- To identify the particular challenges that Arabic-speaking students encounter when learning English.
- To investigate how neurolinguistic techniques can be applied in English language teaching (ELT) to boost communication skills for Arabic-speaking students.
- To share examples of effective neurolinguistic strategies used in ELT classrooms.
- To offer recommendations for educators based on neurolinguistic research.

The Role of Neurolinguistics in Language Acquisition

Neurolinguistics, which is the study of how the brain processes and learns language, is very important for understanding how people learn languages. It helps us understand both how people learn their first language and how they learn a second language. This area of study looks at the mental and brain-related challenges that learners face (Pulvermüller, 2005). Learning a language is closely tied to certain parts of the brain that control how we understand, remember, and use language. According to Friederici (2011), there are some brain areas that are involved in language acquisition and learning. The first one is Broca's Area that is in the left front part of the brain, this area helps with speaking, understanding grammar, and the physical act of talking. The second area is the Wernicke's Area, which is in the left side of the brain near the ear, this part is crucial for understanding language, whether it's spoken or written. The last functional area is Arcuate Fasciculus. This area represents a group of nerve connections which links Broca's and Wernicke's areas, helping to coordinate speaking and understanding. These

brain areas, according to Goral and Lerman (2023), work together to help us learn and use language. For instance, when a child learns their first language, these parts of the brain work together to process sounds, store words, and develop the ability to speak. Goral and Lerman (2023) stresses that language acquisition is not localized to one area of the brain but involves a network of regions that work in tandem to process and produce language efficiently.

Neurological Differences in First and Second/ Foreign Language Learning

Neurolinguistics shows that learning a first language and a second or a foreign language are different in important ways. Both involve the same parts of the brain, but learning a second language usually uses more scattered brain pathways and needs more mental effort (Hernandez & Li, 2007). In young kids, language learning is helped by the brain's ability to easily form new connections, called neuroplasticity. This is why children learn their first language easily and without thinking about it. The brain activity for this is mostly in the left side of the brain. For older people, learning a second language (L2) usually involves more parts of the brain, including both sides. Adults have to think hard about rules and words, which makes learning harder and slower (Penfield & Roberts, 1959). The Critical Period Hypothesis (CPH) says that after puberty, the brain doesn't learn languages as easily because it changes less. While the first language is learned naturally by being around it, learning a second language needs more effort, which makes it harder for learners, especially adults (Russak & Zaretsky, 2023).

Linguistic and Cognitive Challenges

There are challenges that face Arabic speakers when trying to study English. Arabic-speaking students have special difficulties when learning English because the two languages are very different in how they sound and how people think when using them. Altamimi (2015) stresses that the main and first challenge is sound differences in both languages. Arabic has different sounds than English. Students often have trouble with sounds like /p/ and /v/ because their language doesn't have them, which makes it hard for them to say these sounds correctly. As Sammour-Shehadeh et al. also indicated that Arabic-speaking students often say certain English sounds wrong because their language doesn't have those sounds, which affects how clearly they speak and how well they understand spoken English.

Another big challenge for Arabic speakers learning English is writing. A key difference between the two languages is the direction of writing. Arabic is written from right to left, but English is written from left to right. This change might seem small, but it needs a big mental shift. It affects how they read and how they write. For Arabic speakers, switching to the left-to-right way of English can mess up their usual flow, making it harder to read and write smoothly (Abu-Rabia, 1996). The Arabic script has letters that change shape based on where they are in a word. In Arabic, a letter can look different when it's at the start, middle, or end of a word, or if it is by itself. This is very different from English, where letters usually look the same no matter where they are in a word. This difference adds another challenge for people learning English who are used to the changing shapes of Arabic letters. For students who are used to the flexibility of Arabic letters, getting used to the fixed shapes of English letters can be confusing and make learning slower. Abu-Rabia's study (1996) highlighted the challenges that Arabic-speaking learners face when they switch to a new writing system. They need to forget how to write in one script and learn a completely different one, which can slow down their progress, especially in reading and writing. It might take extra time and practice for Arabic speakers to get used to English spelling and the way words are written from left to right. This can affect not only their ability to read and write well but also their confidence in using English in school and social situations. In short, the differences in how Arabic and English are written create special problems for students who speak Arabic. These challenges can slow down their

learning, especially in reading and writing, and they need special teaching methods to help them overcome these issues and learn English more easily.

One of the main difficulties Arabic speakers have when learning English is the difference in how sentences are structured and how words are formed. In Arabic, words often come from a three-letter base, and you can change their meaning by adding extra parts at the beginning, end, or middle. This is very different from English, where words are usually simpler and don't change as much. Machaal (2012) highlighted that the differences between Arabic and English make it hard to learn English grammar, especially the order of words and verb forms. This means that Arabic speakers need to learn not just new words, but also a whole new way of putting words together to make sentences. One big difference between the two languages is how words are arranged in sentences. In Arabic, sentences with verbs often start with the verb, like "Ate Ahmed the apple," which follows a verb-subject-object (VSO) order. But in sentences without verbs, they use subject-verb-object (SVO). On the other hand, English uses subject-verb-object (SVO), like "Ahmed ate the apple". This difference can be confusing for Arab learners learning English because they have to remember to change the order of words to match English sentences. This change in how sentences are built can be hard for Arab learners who need to keep checking their word order to fit the English way. Additionally, English verb forms and tenses can be challenging for Arabic speakers. English heavily uses auxiliary verbs and tense markers, while Arabic has a different way of conjugating verbs. In Arabic, tenses are usually shown by changing the verb root itself, without using auxiliary verbs. English, with its use of auxiliary verbs like "is," "was," and "have," can feel strange and complicated. As Machaal (2012) points out that this difference makes it hard for Arab learners to understand how verb forms and tenses work in English compared to their native language. Another important issue to think about is how hard it is for Arabic speakers to switch between Arabic and English rules. Learning English means not only remembering new words but also stopping the automatic use of Arabic grammar and sentence structure. This means learners have to use extra brain power to understand and learn the new language patterns. Abdolmaleki and Saeedi (2024) stated that Arabic learners often feel very stressed because they have to work so hard to go back and forth between two very different languages. This extra mental effort can make learning English slower and more difficult, as the brain has to keep switching between Arabic and English rules. To sum up, Arabic speakers face major challenges when learning English, such as sentence structure, word formation, and the mental effort needed. The big difference between Arabic's root-based system and English's simpler structure, along with different word orders and tense usage, makes it hard to learn. To get better, Arabic speakers need time, patience, and special teaching to help them understand these language differences and adjust to the English language system.

Challenges for Arabic-Speaking Learners in Learning English

Arabic-speaking students face a range of challenges when learning English, which are influenced by the structural and phonological differences between the two languages, as well as cultural and cognitive factors. This section examines these challenges in detail, providing examples, research-based insights, and potential neurolinguistic solutions.

Phonological Differences Between Arabic and English

Phonology, the study of sounds in a language, reveals significant differences between Arabic and English. Arabic-speaking students often struggle with English sounds that do not exist in Arabic, which leads to pronunciation errors that can hinder communication. One of the most prominent phonological challenges is the difficulty Arabic learners have with certain consonants. For example, the English sounds /p/ and /v/ do not have direct equivalents in Arabic. Arabic speakers often substitute these sounds with /b/ and /f/ because these are the

closest phonological counterparts in their native language (Avery and Ehrlich, 1992). This phenomenon is referred to as phoneme substitution. For example, an Arabic speaker might say "berry" instead of "very" or "ban" instead of "pan." While these substitutions might not completely obscure meaning, they can affect the listener's understanding and create communication barriers.

Additionally, the vowel systems in Arabic and English are very different. English has many more and more complex vowel sounds, with over 20 different ones, while Arabic only has six (three short and three long). This difference can be challenging for Arabic-speaking students to tell apart similar English vowel sounds, like /i/ and /ɪ/ (for example, "beat" and "bit").

So, training in phonology can help solve these problems by improving the brain's ability to handle new sounds. Methods like auditory discrimination tasks can assist learners in distinguishing sounds that are not in their native language (Al-Ani, 1970). These tasks involve repeatedly hearing pairs of words that differ by just one sound, helping students slowly create new brain connections that make it easier for them to hear and say English sounds correctly. According to Strange and Shafer (2008), the phonological awareness training can lead to significant improvements in second language learners' ability to perceive and produce non-native sounds, as it engages the brain's capacity for neural plasticity and adaptation.

Grammatical Differences Between Arabic and English

The way sentences are built in Arabic is quite different from how they are built in English, which can make it hard for students who speak Arabic to form sentences correctly in English (Swan & Smith, 2001). In Arabic, the verb usually comes first, followed by the subject and then the object. This is called a Verb-Subject-Object (VSO) structure. On the other hand, English sentences have the subject first, then the verb, and finally the object, which is called a Subject-Verb-Object (SVO) structure. This difference in how sentences are put together can cause confusion and mistakes in the order of words. For example, an Arabic-speaking student might say "went the teacher to the class" instead of the correct English sentence "the teacher went to the class". This incorrect word order shows the influence of the VSO pattern from Arabic.

Another grammar challenge is using the articles in English. Swan and Smith (2001) claimed that Arabic does not have an indefinite article like "a" or "an" in English. Arabic also uses just one definite article, "al-", for all nouns, while English has different ways to use articles, like "the" for specific things and no article for names or general ideas. Because of this, Arabic-speaking students might forget to use articles or use them wrong when speaking English (Swan & Smith, 2001).

So, methods like syntactic parsing, which are part of neurolinguistic techniques, can help students learn the right way to build sentences in English. Parsing means taking sentences apart to see their parts (like subject, verb, object) and understanding how these parts work together. By practicing making sentences in a clear way, students can remember the rules of English better, which can make it easier for them to use English without being confused by their own language. In this regard, Ullman (2005) indicated that second language learners get better with activities like parsing because these activities help the brain make quick connections that make speaking the language smoother.

Cultural and Educational Influences on Language Learning

Learning a language is not just about understanding words and grammar; it is also about understanding the culture behind it. Students who speak Arabic often learn English in ways that focus more on memorizing facts than on actually using the language to communicate. Also, the way people talk in Arabic culture is usually more formal and indirect, while in English

culture, people often speak more directly and casually (Al-Issa, 2005). These differences can make it harder for Arabic-speaking students to learn English, especially in social and school settings. For instance, an Arabic-speaking student might feel unsure about asking questions in class or having casual chats with native English speakers, worried that they might seem not understood or unable to convey the exact meanings. This can reduce chances to practice speaking English and improve fluency.

Teachers can use techniques from neurolinguistics to create a learning environment that promotes positive emotions and reduces stress. One helpful method is mirroring, where the teacher matches the student's body language and speech to build a connection and make the learning space more comfortable. This approach works with the brain's mirror neuron system, which helps with empathy and understanding others. Creating a supportive and non-threatening environment is crucial for language learning, as it allows students to engage more fully with the language without fear of judgment or failure (Richards & Rodgers, 2014).

The Diglossic Challenge in Language Acquisition

Arabic is a diglossic language two main forms: a formal written version called Modern Standard Arabic (MSA) and many different spoken dialects (Bassiouny, 2009). Students who speak Arabic have to switch between MSA and their local dialect, which makes learning English more challenging. For instance, a student might use MSA words and grammar when writing in English but switch to their dialect when speaking. This can cause mixed-up language use and confusion when trying to follow English rules. Teachers can assist students in handling the mental challenges of diglossia by using strategies to manage cognitive load. One strategy is chunking, which means dividing complex information into smaller, easier-to-manage parts. By teaching English in smaller sections—like common phrases or sentence structures—teachers can help students understand the language better and reduce the mental effort needed to switch between languages.

Neurolinguistic Techniques for Overcoming Challenges in ELT

Neurolinguistic techniques offer useful methods for helping Arabic-speaking students overcome difficulties in learning English. By using ideas from neurolinguistics, teachers can help students deal with the language, thinking, and cultural differences they face when learning to communicate in English. Here are some effective neurolinguistic strategies:

Brain Based Strategies

Brain-based learning means using teaching methods that match how the brain naturally learns and handles information. These methods use the brain's ability to change and improve (called neuroplasticity) and involve different senses to help with language learning.

Using different senses—like seeing, hearing, and moving—helps strengthen language learning by making more connections in the brain. This leads to better remembering and understanding. For students who speak Arabic, using many senses can be especially helpful because it lets them learn language in different ways (Bassano, 1982). For instance, computer-based programs that use multiple senses have been proven to greatly enhance English reading abilities in students with dyslexia and reading challenges, including those who speak Arabic. Gharaibeh and Dukmak (2022) found out that using multisensory methods, like visual tools, listening exercises, and physical activities, helped students with dyslexia make significant improvements in both English reading and writing. By integrating multisensory activities into the curriculum, teachers can address the varied learning needs of Arabic-speaking students and reduce cognitive load.

In a flipped classroom strategy, students learn new material at home (through videos or reading) and participate in hands-on activities during class. This method is based on brain

science, as it lets learners review and understand new information at their own speed, which helps avoid feeling overwhelmed (Bergmann and Sams, 2012). In class, students work together on activities that use different parts of their brains, strengthening their learning. Abdolmaleki and Saeedi (2024) found that using a brain-friendly flipped classroom approach greatly improved vocabulary and reading skills in English learners. This is because students can think about and remember new information at home, and then do more complex activities in class. For Arabic-speaking students, this approach eases the stress of learning new material quickly, allowing them to better understand difficult language concepts. Neurolinguistic Programming (NLP) uses language and behaviour strategies to change how the brain thinks and improve learning. NLP methods can help Arabic-speaking students with pronunciation by teaching the brain to process language better.

Improving Pronunciation with NLP Methods

There are some NLP methods like visualization and anchoring which can help improve pronunciation. For example, students can imagine the movements of their lips and tongue when practicing tricky English sounds (like /p/ and /v/). By connecting certain body movements to making sounds, students can better learn these sounds. Al Fayyumi (2017) stated that NLP exercises can fix pronunciation mistakes by involving the motor skills needed for speaking. These exercises help re-train the brain's pathways for speech, making it easier for Arabic speakers to produce English sounds they are not used to. Macaro (2001) emphasized that visualization is a way for learners to form mental pictures or scenes that assist them in understanding and remembering language ideas. By imagining themselves speaking confidently or comprehending language in everyday situations, learners involve the brain's visual and sensory parts, which helps build stronger connections related to language learning. When learners picture themselves using the language they are learning (like speaking smoothly in a conversation), the brain's visual part gets active. This helps the brain make connections between the language and how it is used in real life. Visualization helps learners remember words and language patterns better by connecting them with clear mental images. For instance, imagining an apple while learning the English word "apple" makes the connection between the word and the object stronger in the brain.

A student studying the word "airport" could imagine themselves going through an airport, talking to workers in English, and remembering words like "check-in" or "luggage." This clear mental picture helps strengthen language learning by involving the senses. Therefore, visualization methods help learners form mental pictures of language, which helps both understanding and remembering by linking language with real, sensory experiences.

Anchoring is a method used in NLP that connects a particular feeling or physical state to a word, phrase, or experience, making it simpler to remember and use language later on. By forming positive connections with language use, learners can reduce their anxiety and improve their performance in everyday situations. The brain's amygdala and limbic system, which handle emotions, play a role in forming strong emotional memories. Anchoring works by linking positive feelings to specific language tasks, helping learners feel more confident and motivated when speaking or listening. Dilts, 1998) indicated that Anchoring connects a wanted emotional state with a particular action, making it easier for learners to remember language and feel more confident when using it. Anchors can also be physical actions or gestures that trigger a mental state. For instance, a student might lightly tap their wrist or press their thumb and finger together when trying to remember a specific vocabulary word, reinforcing the memory through physical movement. In a speaking practice, a learner who speaks Arabic might use a technique called anchoring. This means they connect a feeling of calm and confidence with the action of taking a deep breath before they start speaking. Whenever they feel nervous about

speaking English, they can take that deep breath again to bring back the confident feeling they anchored.

Therefore, visualization and anchoring are strong neurolinguistic methods that use the brain's natural ways of remembering, feeling, and learning. By involving the brain's senses and emotions, these techniques form strong connections in the mind and heart, making language learning more effective and fun. When used in ELT, they can help students—especially those from difficult language backgrounds like Arabic speakers—boost their confidence, memory, and overall language skills.

Managing Mental Effort for Better Learning

Cognitive load theory says that making it easier to understand new information helps with learning. For Arabic speakers learning English, breaking down tasks into smaller, easier parts can greatly improve their language learning.

The first method is information chunk which refers to breaking down complex information into smaller, easier-to-understand parts helps reduce the mental effort needed and makes learning languages easier. For example, instead of teaching all the complex rules of English grammar at once, teachers can introduce one rule at a time, giving students time to fully understand each rule before moving on. Machaal (2012) highlighted the importance of not overwhelming learners of Arabic by saying that breaking down language structures into smaller, understandable pieces helps students remember the information better. This step-by-step approach to learning languages allows the brain to focus on mastering smaller parts of the language without feeling overwhelmed.

The second technique is scaffolding which means giving temporary help to students until they can do a task on their own. By slowly reducing the support, teachers can help Arabic-speaking students feel more confident and independent in using English. Scaffolding techniques match how the brain learns new skills and understands language. Gharaibeh and Dukmak (2022) showed that using scaffolding in multi-sensory learning settings helped students with learning difficulties move from needing a lot of help to using the language independently. This method works well for all learners, as it encourages them to take charge of their learning while gradually improving their fluency and understanding.

Leveraging the Bilingual Advantage

Studies in neurolinguistics show that being bilingual improves mental control, especially in activities that need focus and memory. This is called the bilingual advantage, and it can help Arabic-speaking students when they learn English. Code-switching and translanguaging show the many ways bilingual and multilingual people use their languages. They show how people mix languages in different situations, which helps them express who they are and communicate better. Learning about these ideas can help us understand and appreciate how languages are used in different ways by different groups of people.

Changing languages during a conversation, often called code-switching, happens when people switch between two or more languages in a single talk or situation. Studies have found that this practice can trigger different brain activities, involving mental processes that help improve problem-solving and language learning. When someone code-switches, they are actually exercising their brain to move between different language systems, which enhances overall mental flexibility. A study by Russak and Zaretsky (2023) indicated that people who speak two languages have better mental systems for handling multiple languages. This ability to manage languages improves brain function, especially in parts of the brain that control decision-making, focus, and memory. Because of this, bilingual students usually show better mental quickness, which scientists call "mental flexibility." This flexibility helps them think about problems in various ways, quickly adjust to new information, and use language rules

more effectively in different situations. Russak and Zaretsky (2023) highlight the mental advantages of being bilingual, saying that bilingual individuals create more effective brain systems for managing multiple languages, resulting in better mental flexibility and stronger language abilities. This idea implies that students who are supported to use both their first language (Arabic) and the language they are studying (English) in school will gain cognitive benefits that extend beyond just language mastery. The act of switching between languages not only improves their language skills but also boosts their problem-solving skills, adaptability, and higher-level thinking. So, using code-switching in classrooms with students who speak both Arabic and English can help them become better at both languages over time and also improve their thinking skills.

Translanguaging is a teaching method that uses both Arabic and English in the classroom to help students learn languages better. This approach lets students use their native language, Arabic, as a base to understand and learn English. By using students' knowledge of Arabic, teachers can make the learning environment easier and more supportive, helping students understand and remember better. The main advantage of translanguaging is that it helps connect the students' native language with the language they are learning. Instead of separating the two languages or forcing students to use only one, this approach allows them to move smoothly between them. When students can switch languages, it makes it easier for them to understand new ideas, because they do not have to worry as much about the rules of the language. This helps them understand and communicate better in the new language. Khamis and Bortz (2023) emphasized that translanguaging is a very useful method for learning a new language. Adamson (2015, p. 11) mentioned that "This approach (translanguaging for in-class and report writing purposes) was initially taken to mean the transfer of knowledge from content classes to the lecture class or the use of new note-taking skills across the curriculum. unexpectedly, however, the use of content acquired in the CLIL lecture class over to the content curriculum presented a new dimension of cross-fertilization of skills and knowledge between the lecture class and content classes."

Students use all their language abilities, making it simpler for them to understand and use the new language. This means that when students can use all their language skills—speaking, reading, writing, or thinking in both languages—they can learn better. Using their language skills in this complete way makes learning more meaningful and faster, because it reduces confusion and frustration. Moreover, translanguaging helps students by recognizing their native language in the learning process. Instead of being forced to forget their first language, students feel valued and respected, which can increase their confidence and eagerness to learn the new language. This method also reflects how people actually use language in real life, where those who speak multiple languages often switch between them to better express themselves or to grasp difficult concepts. Basically, translanguaging creates a more welcoming and successful learning environment. It uses the natural language skills students already have, helping them connect what they already know with the new language they are learning.

Neurolinguistic techniques provide strong solutions to the difficulties Arabic-speaking students face when learning English. By using brain-focused strategies, NLP methods, managing cognitive load, and taking advantage of bilingual skills, educators can create more effective and inclusive English language learning environments. These methods not only help with the linguistic and cognitive challenges Arabic-speaking learners encounter but also improve their overall language learning experience. As research in neurolinguistics advances, the possibilities for more refined and targeted teaching approaches will continue to develop.

Logically, code-switching usually follows certain grammar rules and happens at specific places in a conversation, whereas translanguaging is about the smooth blending and combining of languages during communication.

Neurolinguistics and Listening and Speaking Skills in ELT

According to Gazzaniga (2008), neurolinguistics helps us understand how the brain handles language, which can be used to improve how we teach listening and speaking in English Language Teaching. For students, especially those who speak languages very different from English, like Arabic, knowing how the brain works with language lets teachers use more effective, brain-friendly teaching methods. Here, we explain the brain processes behind listening, ways to use neurolinguistics to improve listening and speaking, and examples showing how these methods work.

Brain Functions Involved in Language Acquisition

Listening comprehension is a complex mental process that involves different parts of the brain working together to understand spoken language.

The primary auditory cortex, located in the temporal lobe, handles incoming sound signals. It identifies basic sound features such as pitch, tone, and volume. After processing these features, the information is sent to other parts of the brain that interpret the meaning of the sounds. "Semantic information is represented in a highly distributed fashion throughout the cortex, and middle posterior temporal regions are involved in the mapping between phonological representations in the STS and widely distributed semantic representations." (Hickok & Poeppel, 2007, p. 397).

Wernicke's area, found in the left side of the brain, is very important for understanding language. It helps the brain understand words and sentences by turning sounds into meaningful language. Friederici (2002) argued that Wernicke's area turns spoken language into understandable words by decoding the sounds. For Arabic speakers learning English, this area is key when dealing with new English sounds and sentence structures.

Broca's area is usually linked to producing speech, but it also helps in understanding complex sentence structures. It becomes active when the brain deals with sentence patterns that vary between languages, like the subject-first order in English compared to the verb-first order in Arabic. "The posterior region of the dorsal stream corresponds to an area in the Sylvian fissure at the parietotemporal boundary, which is proposed to be a sensorimotor interface, whereas the more anterior locations in the frontal lobe, probably involving Broca's region and a more dorsal premotor site, correspond to portions of the articulatory network". (Hickok & Poeppel, 2007:395). Broca's area is important not just for speaking but also for handling complex sentences, which is crucial for understanding languages that are not your native tongue. "The frontal operculum is responsible for the combining of two elements independent of syntactic phrasal aspects, whereas syntactic phrase structure building is subserved by in Broca's area." (Friederici, 2016, p. 43).

Working memory, which is found in the front part of the brain, temporarily stores sounds while they are being processed. (Baddeley, 2003) explained that working memory is very important for understanding language, as it keeps information for a short time so that the brain can process it further. This is especially important for understanding longer or more complicated sentences. For learners who speak Arabic, this is particularly important because they might need to remember whole phrases to understand the structure of English sentences.

Brain Functions and Listening Skills

Using ideas from brain and language science, teachers can use certain methods to help English learners improve their listening skills, especially those who speak languages like Arabic that are different from English. The first skill is training in sound awareness that helps learners recognize English sounds that are not in their native language. For example, learners who speak Arabic might have trouble with sounds like /p/ and /v/ because these sounds are not in Arabic. This training makes the brain better at processing sounds. Exercises that compare

similar words like (pat and bat) can help learners notice the differences in English sounds. Zhao and Yang (2016) mentioned that training in sound awareness is important for helping learners tell apart and make sounds they are not familiar with, which helps them understand what they hear.

The second way is listening and repeating means hearing a native speaker and immediately saying what they said. This method helps both the part of the brain that listens and the part that speaks, making it easier to understand and speak smoothly. Repeating what you hear activates important brain parts for both listening and speaking, allowing learners to understand and speak at the same time (Hamrick & Rebuschat, 2012). For example, an Arabic-speaking student can listen to an English podcast and quickly repeat the sentences, paying attention to pronunciation and fluency.

The third method is adopting different senses to improve how we learn through sound. By mixing sound with visuals or hands-on activities, learners involve more parts of their brain, which helps them understand and remember better. Teachers can show videos with captions or pictures that match the audio to make the connection between sounds and meanings stronger. Shams & Seitz (2008) indicated that using multiple senses activates different parts of the brain, which helps us remember and understand better by involving more than one senses.

The last one is listening comprehension gets better when language is used in real situations. When learners hear language in specific everyday scenarios, they can more easily understand the meaning and recognize how sentences are structured. Gernsbacher and Kaschak (2003) hinted that practicing listening in these situations helps learners use clues from their surroundings and the language itself, which improves their overall understanding. For example, practicing English conversations about checking into a hotel or ordering food at a restaurant gives learners useful context, making it easier for them to understand the language.

Brain Functions and Speaking Skills

Speaking, like listening, involves many brain processes that can be improved with specific brain-focused techniques. These techniques concentrate on speech production, pronunciation, and self-checking, helping learners speak more smoothly and correctly.

The first technique relies on repeated speaking practice which strengthens the brain connections involved in speech. By frequently using common phrases and sentence patterns, learners can speak more naturally and easily. Arabic-speaking learners can practice common English phrases, like greetings and introductions, repeatedly to improve fluency. Fluency is gained through repeated exposure and practice, which strengthens the brain pathways involved in language production.

Secondly, just like listening, speaking can get better by using more than one sense. When practicing speaking, using hand movements, facial expressions, or visual tools helps learners involve both the motor and language parts of the brain. This helps them find the right words and speak more clearly. Encouraging learners to use hand gestures when talking about actions helps them remember words and speak more naturally. In this way, Iverson and Thelen (1999, p. 21) emphasized that “Gesture and speech are tightly connected to one another, and there are links between gesture and speech throughout the process of speech production, occurring at the levels of discourse, syntax, semantics, and prosody. From this perspective, gesture and speech co-occur during production because they are linked to one another and to the same underlying thought processes (even though each modality may express a different aspect of that thought). Any disruption in the process of speech production should therefore have an effect on gesture, and vice versa.”

Self-Monitoring is the third technique. Neurolinguistics highlights the importance of the anterior cingulate cortex (ACC) in detecting errors and managing self-monitoring. Encouraging students to review and fix their mistakes helps improve their speaking accuracy

and confidence. After a speaking activity, students can listen to recordings of their own speech and pinpoint areas where they made mistakes, like mispronunciations or grammar errors. (Ullsperger & von Cramon, 2004) pointed out that the brain's system for monitoring errors is very important for improving speech, as self-correction helps in producing accurate language.

Neurolinguistics and Reading and Writing Skills for Arabic Learners

Neurolinguistics helps us understand how the brain handles reading and writing, which is useful for helping Arabic speakers learn English. Because Arabic and English have very different writing systems, Arabic learners have special problems with spelling, sounds, and sentence structure. This part looks at the spelling challenges in learning English, ways to improve reading and writing skills using neurolinguistics, and real classroom situations showing how these methods work.

Reading is a complicated task that uses different parts of the brain, such as the occipital lobe, which deals with seeing things, the angular gyrus, which connects written words to their sounds and meanings, Broca's area, which helps with speaking, even when reading quietly and Wernicke's area, which helps understand the meanings of words and sentences.

For people who speak the language they are reading, these brain parts work together to understand and make sense of the text. But for Arabic speakers learning English, the brain needs to adjust because the Arabic and English writing systems are very different.

Difficulties to Read English for Arabic Speakers

Arabic-speaking students encounter particular difficulties when learning to read English, mainly due to differences in writing systems, spelling rules, and how sounds are processed.

Writing System and Reading Direction:

One of the first challenges for Arabic speakers learning English is switching from reading from right to left (Arabic) to reading from left to right (English). This change can make the reading process slower and cause confusion as learners try to follow words and sentences. An Arabic-speaking student may read English text more slowly as their brain gets used to the different reading direction. This can also cause them to miss lines or read words in the wrong order, especially when they are just starting to learn. Strategies for transferring skills from one language to another can help students adjust to reading in a new direction. Teachers can use visual tools and guided reading activities to slowly train the brain to read from left to right. Studies show that regular practice with exercises like following sentences with a finger can help strengthen this change.

Phoneme-Grapheme Connection:

In Arabic, the relationship between sounds (phonemes) and letters (graphemes) is quite consistent. Dickerson (1980) stressed that English has a more irregular spelling system, where the same letter combinations can make different sounds (like "ough" in "through," "though," and "tough"). This irregularity adds extra mental effort for Arabic learners, who are used to a more predictable system. An Arabic speaker might find it hard to understand English words like "cough" and "rough," because they expect the letters to sound the same in different words. Phonics-based teaching can be very helpful in dealing with these difficulties. By concentrating on phonological awareness, teachers can assist students in forming the brain connections needed to accurately read English text. Activities that involve breaking words into individual sounds and combining sounds engage the brain's auditory and visual centers, enhancing students' ability to connect sounds with letters. Snowling (2000) hinted that improving phonological awareness in second language learners is essential for developing reading fluency, as it allows the brain to better connect phonological input with written symbols.

Vocabulary Acquisition using Semantic Networks

English has many more words than Arabic, so students who speak Arabic have to learn a lot of new words. Sometimes, words that sound or look similar in both languages have different meanings, which can cause confusion and misunderstandings. For example, the Arabic word "مكتبة" (maktaba) means a place where books are sold, but students might think it means a "library" in English, which is a place for reading books. This difference can lead to confusion. Teachers can use semantic mapping to help students create connections between related words. This method, based on how the brain processes language, involves making visual diagrams of word groups, synonyms, antonyms, and related ideas. By arranging vocabulary in a structured way, the brain can more easily remember and recall new words. Schmitt (2010) explains that semantic mapping engages different parts of the brain, especially those involved in memory and language, making it easier and more effective to learn new vocabulary.

There are brain parts that are involved in writing a second language and these several mental tasks are the Motor cortex, which manages the physical action of writing or typing, Broca's area, which helps create sentences that follow the rules of grammar, and the Prefrontal cortex, which is responsible for planning, organizing, and editing written material. When writing, learners need to use grammar rules, remember words, organize their ideas, and form sentences—all while keeping their writing smooth. For learners who speak Arabic, these tasks are more challenging because Arabic and English have different ways of spelling, arranging words, and organizing ideas.

Difficulties in Learning to Write in English

Orthographic and Directionality Problems:

Just like reading, switching from writing right-to-left in Arabic to writing left-to-right in English can be difficult. Arabic script is connected, and the shape of letters changes based on their position in a word, while English letters stay the same. These differences mean Arabic learners need to develop new ways to write English letters. Students who speak Arabic might have trouble forming English letters, especially when writing in print instead of cursive. They might also mix up the direction of their writing, especially when they are still getting better at it.

Multisensory writing methods can assist students in learning and remembering the shapes of English letters and the correct way to write them. By doing hands-on activities (like writing letters in sand or using special paper with raised lines), students can strengthen the physical skills needed for writing in English. According to Richards and Rodgers (2014) multisensory techniques involve different parts of the brain, including the area that controls movement, which helps learners write letters and words more smoothly.

Spelling and Sound-Letter Relationships

English spelling is more complex than Arabic, which has a simpler connection between sounds and letters. English learners need to remember many spelling rules and exceptions, which makes learning harder. An Arabic speaker might spell English words with silent letters, like "knight" or "island," incorrectly because Arabic doesn't have these silent letters. Using a Brain-Based Method: Practicing spelling patterns and teaching sounds through phonics can help students create connections in their brains between sounds and letters. By doing repeated spelling exercises, students strengthen the brain pathways that help them remember and use English spelling rules. Repeated practice with spelling patterns helps create stronger brain connections, making it easier for learners to handle the irregularities in English spelling.

Syntactic Transfer from Arabic to English

Arabic sentences usually have the verb before the subject and object (Verb-Subject-Object), but English sentences have the subject before the verb and object (Subject-Verb-Object). This difference can cause mistakes when Arabic speakers write in English. For example, a student might write "Went the teacher to the store" instead of "The teacher went to the store," showing the Arabic word order. Practicing sentence analysis can help students learn the correct word order in English. By understanding the parts of a sentence (subject, verb, object), students can better create sentences in English. Ellis (2003) indicated that sentence analysis helps non-native speakers organize language more effectively, making it easier for them to write correct sentences. Arabic writing, particularly in academic contexts, often uses a more elaborate and indirect style. In contrast, English writing usually focuses on clarity and directness. This difference can make it challenging to create clear and concise English texts. An Arabic-speaking student might write lengthy, complex sentences with many smaller parts, which can be hard for English-speaking readers to understand. Teachers can help students learn about different types of writing, like academic essays or business letters, by teaching them the rules and patterns for each type. Hyland (2007) says that learning these patterns helps students understand how to write for different readers. By practicing these rules, students can remember the right way to write for each type of writing.

Future Directions for Neurolinguistics in ELT

Neurolinguistics has a lot of potential to improve English Language Teaching (ELT), especially for Arabic-speaking students who have special language challenges. As research in neurolinguistics grows, it provides new ideas about how people learn languages and how to teach them better. Also, new technologies and changes in policies are likely to influence ELT around the world. This part looks at these future possibilities by studying new research, technological developments, policy suggestions, and the bigger global effects of neurolinguistics on ELT.

Emerging Research in Neurolinguistics and Language Teaching

Neurolinguistics has consistently helped us understand how the brain handles language, which is important for learning and teaching languages. New studies show that this could greatly affect how we teach English to Arabic speakers.

Bilingualism and Cross-Linguistic Influence

In this context, bilingualism means being able to use two or more languages well. It requires the brain to handle and understand two different language systems at the same time. Studies in neurolinguistics have found that bilingualism uses both common and separate brain networks for each language. The part of the brain that helps with decision-making, called the prefrontal cortex, is very important for switching between languages, preventing one language from affecting the other, and making sure the right grammar, words, and sentence structure are used in each language.

Recent studies in neurolinguistics are helping us understand how bilingual and multilingual people's brains work, especially how they store and use different languages. This is very important for Arabic speakers, who often switch between Modern Standard Arabic (MSA) and their local dialects like Egyptian or Levantine Arabic. These switches can either help or hinder learning English, depending on how well learners use their Arabic knowledge when learning English. Research shows that bilingual brains can have cognitive benefits, like better control over switching between languages and preventing one language from interfering with another (Green, 1998; Kroll & Bialystok, 2013). However, learning languages with different structures, like English and Arabic, can also cause difficulties due to cross-linguistic interference (Abu-Rabia, 2001). Being bilingual can make your brain more flexible. This

happens because people who speak two languages often have to switch between them, stopping one language while using the other. This "bilingual advantage" is especially helpful in tasks that need good control, like solving problems or doing many things at once. So, bilinguals might be better at these kinds of tasks.

The second point is Cross-linguistic influence (CLI), which is also known as language transfer, happens when one language affects the learning or use of another language. In people who speak two languages or are learning a new one, the structures, words, and rules of one language can change how they understand or speak the second language. For Arabic speakers learning English, the way their native language affects their new language is very important. This can help or make it harder to learn English. Because Arabic and English are different in how they are built, it's common for Arabic speakers to make mistakes when learning English. This happens especially in these areas:

Phonologically, Arabic and English have different sounds. Arabic speakers learning English might have trouble making sounds that don't exist in Arabic, like the /p/ sound. They might say /b/ instead, making mistakes like saying "bark" instead of "park." This is when the sounds of their first language affect how they say the new language.

Syntactically, Arabic and English have different ways of arranging words and sentences. This difference can cause mistakes, especially when people learning English use Arabic sentence patterns. For example, in Arabic, you can leave out the subject, but in English, you need to include it. So, instead of saying "Is going to the store," you should say "He is going to the store."

Arabic speakers often struggle with English grammar, especially with verb tenses, articles, and prepositions. These problems happen because these parts of grammar are either used differently in Arabic or don't exist in the language at all. For instance, Arabic doesn't have words like "a" or "an," which leads to mistakes like saying "I have car" instead of "I have a car."

Mohammad T. Alhawary explains that the lack of articles in Arabic often causes mistakes when English learners don't realize they need to use articles in situations where native speakers would expect them. This can also lead to using definite articles incorrectly, like saying "the life is beautiful" instead of "life is beautiful." Moreover, English verb tenses, which are very structured and exact, can be confusing. In Arabic, tenses are not as complicated. As Mahmoud Al-Batal (2018) explains that Arabic verbs mainly depend on the situation to show time, but English requires exact use of helping verbs and changes to mark the tense. This can lead to mistakes like "He go yesterday" instead of "He went yesterday," because the speaker might use Arabic's simpler verb structure in English. Prepositions can be tricky because they work differently in the two languages. In Arabic, prepositions don't always match up with their English equivalents, and they can be used in more varied ways. For example, someone might mistakenly say "I live on the house" instead of "I live in the house." Alhawary points out that "English prepositions are especially hard for Arabic speakers because the connections they show often don't match how prepositions are used in Arabic." These grammar challenges show how difficult it is for Arabic speakers to become fluent in English, because the basic structures of the two languages are very different.

Hence, being bilingual and understanding how languages affect each other are important when learning a second language, especially for Arabic speakers learning English. Sometimes, knowing another language can cause problems with pronunciation, sentence structure, and grammar. However, being bilingual can also help with learning and thinking skills. By understanding how languages influence each other, teachers can create better ways to teach English to bilingual students, helping them learn the language more easily.

Technological Advancements for ELT

Artificial Intelligence (AI) is becoming more and more important in education, and it's having a big effect on teaching English as a second language (ELT). AI tools are changing the way students learn, and teachers teach by making learning more flexible, personalized, and efficient. Many studies show that AI can help create better learning experiences that fit each student's needs, making learning more effective and easier to access. Luckin et al. (2016) highlighted the importance and impact of technological advancements that are revolutionizing education, and neurolinguistic applications in ELT stand to benefit significantly from these innovations. New technologies such as Artificial Intelligence (AI) and Virtual and Augmented Reality (VR/AR) and Neurofeedback Tools provide the tools to apply brain-based learning methods in more accessible and efficient ways.

AI-based tools are being used more and more in language learning. These tools use special computer programs to customize learning for each student, changing the level of difficulty and the material based on how well the student is doing. In English language teaching (ELT), AI can give immediate feedback on pronunciation, grammar, and understanding. Also, AI can spot common mistakes students make and adjust the lessons to help them improve (Li & Hegelheimer, 2013). This helps Arabic-speaking students get personalized help with parts of the language they find difficult.

Virtual and Augmented Reality are powerful tools for learning languages, especially English. They provide learners with realistic situations where they can practice speaking English in everyday settings, like shopping, traveling, or attending a business meeting. This helps Arabic-speaking students move from just knowing the language to actually using it in real conversations. For example, in a virtual world where an Arabic learner talks to computer-generated people, they can improve their speaking skills and pronunciation. They also get immediate help if they make mistakes (Lin & Lan, 2015).

New neurofeedback tools help educators see how students' brains are working during learning. This lets teachers and students change their methods right away. Neurofeedback tools might be used to improve language learning by showing when a student's brain is ready to learn new things. This could help teachers give lessons at the best times for learning (Van Veen & Carter, 2020). So, neurofeedback can measure stress, focus, and how hard the brain is working. This helps teachers know when a student is having trouble and adjust the lesson to help them.

Conclusion

As neurolinguistic methods keep changing how English Language Teaching (ELT) works, especially for Arabic-speaking students, this conclusion gives a full review of the main points talked about, shows how important neurolinguistics is for better language teaching, and gives final advice for teachers, leaders, and researchers. The results and recommendations are meant to help with the problems and use the chances that neurolinguistics offers to improve language learning. This paper looked at how neurolinguistics helps with the special problems Arabic-speaking students have when learning English and provided the key findings below:

Arabic students often struggle because Arabic and English have big differences in sounds, word structure, and spelling. For example, hearing the difference between "p" and "b" can be hard because the brain works differently for each language. Special training that focuses on recognizing sounds can help with this. Methods like learning through multiple senses, teaching language in real-life situations, and managing how much information the brain takes in at once can help the brain learn better. These methods improve remembering, understanding, and speaking. Multisensory learning, which uses different senses, is especially good for learning new words and sounds. New technologies like AI, brain-monitoring tools, and virtual/augmented reality can help apply brain and language principles in new ways. These tools can create personalized, flexible learning experiences that fit each student's needs, which

is especially helpful in big, diverse classes or online learning. Recent research on learning languages as a child or adult, and how different languages affect each other, gives us a better understanding of how the brain handles multiple languages. This is very important for Arabic speakers who often use Modern Standard Arabic, local dialects, and English.

For effective use of neurolinguistic methods, teacher training programs must include neurolinguistic research in their courses. Decision-makers should also support investments in facilities and technology that help with brain-focused learning, making sure teachers and students have the right resources.

Recommendations

To make the most of neurolinguistics in English language teaching (ELT), it's important for teachers, and scientists to work together. These suggestions are meant to help bring neurolinguistic methods into language education and encourage more research in this field. Teachers should include ways of teaching that help the brain learn, like understanding sounds in words, using different senses to learn, and connecting new information to what students already know. These methods should be adjusted to fit the needs of students who speak Arabic. Educators should keep getting training on how the brain learns languages and the newest research on this topic. Also, researchers should team up with educators and technology experts to use neurolinguistic research in real classrooms. This teamwork can turn theoretical research into useful teaching techniques and tech tools that help students directly.

In short, neurolinguistics provides important information about how our brains learn languages, which can help create better ways to teach English to speakers of other languages (ELT). By knowing how the brain works with language, teachers can use methods that match how people naturally learn, improving results for Arabic-speaking learners. With more research, new technology, and support from leaders, neurolinguistics can change language education, making it more tailored, interesting, and effective for students around the world.

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