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Investigating teachers' awareness and use of neuroscience findings to improve their teaching practices of English with early multilingual children

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Abstract

Algerian primary schools have recently embarked on the teaching of English as a foreign language. This study attempts to evaluate this situation of early multilingualism through the lens of neuroscience findings, as English is taught alongside with French, Arabic and Tamazight in some regions of Algeria. This descriptive research aims primarily to collect the different teachers' views about their awareness and use of neuroscience findings to improve their teaching practices of English with children.Therefore, a questionnaire was distributed to a sample of 67 teachers who are concerned with teaching English at primary school during the (2023- 2024) academic year . The data collected, using close-ended and open-ended questions were analyzed quantitatively and qualitatively as a way to establish a link between neuroscience and teaching practices. The findings revealed that while participants demonstrated a solid understanding of the field and expressed positive views about the application of neuroscience to their teaching several crucial core areas remain frequently neglected making their integration into academic professional development programmes a necessity. This knowledge will help teachers to effectively address the challenges they encounter during their teaching experiences within this multilingual environment.

Keywords: Teachers' awareness, neuroscience, teaching practices-early multilinguism.

Introduction:

This research seeks to evaluate teachers' awareness and use of neuroscience findings to improve their English teaching practices with multilingual children. Therefore, this study begins with a general overview of the field of neuroscience and enumerates the main findings that are related to language learning such as neuroplasticity, the critical period for language learning, memory and memory overload problems. Finally, it examines some key neuroscience findings related to neural organization in bilingual and multilingual brains and the implications of early multilingualism for language practices. Moreover, it presents clinical concepts such as speech delay, and developmental language disorder and their pedagogical implications to the field of English language learning in Algerian primary schools.

Neuroscience, also called Neural Science, has made significant contributions to the field of language learning. Moreover, neuroscientists have relied on brain imaging techniques to draw attention to the different language functions of the brain at its developmental stages. Furthermore, neuroscientists have precisely

situated the brain structures that are responsible for language processing and learning —most notably Broca's area, which governs language production, and Wernicke's area, which is responsible for comprehension (Friederici, 2005). In general, neuroscience findings on language learning can improve educational practices in multilingual learning contexts and provide pedagogical and therapeutic solutions for learners with language difficulties such as speech delay and developmental language disorder.

Neuroscience findings

1-The Critical Period

The concept of a "critical period" for language learning was primarily a hypothesis that relied mainly on some atypical cases of language development that were reported worldwide. Later on, it was supported by developmental psychology and neuroimaging research. Lenneberg (1967) hypothesized that language could be acquired only within a critical period: “The Critical Period for first language acquisition lasts from birth until puberty. If a child doesn’t acquire language during this period (...) then he or she will find it almost impossible to learn language later on” (Yule, 1985:166).

This hypothesis states that language must be acquired during early childhood making it almost impossible to acquire the first language beyond this period, due to what is called lateralization, which means the specialisation of the left hemisphere for language. This neurological specialisation begins in the early childhood – the exact period during which first language occurs.

From a neuroscientific perspective, what happens inside the brain during the critical period is mainly due to the regression of connectivity between nerve cells .The brain goes through the reduction of unnecessary connections as language development takes place. In other words, the neural synaptic connections are created, or built, as we learn language; however, the unnecessary ones merely decay throughout language learning stages. In general, individuals can learn languages at any age. However, neuroscience, psychology, and linguistics support early exposure to achieve high proficiency levels.

2-Neuroscience and cognitive load theory

Cognitive Load Theory (CLT), developed by John Sweller in the 1980s, indicates that the human working memory has a limited capacity while processing information. Therefore, when the cognitive load exceeds this threshold, learning becomes less effective. Moreover, three types of cognitive loads are explained in John Sweller’ theory .First, the intrinsic load is related to learner's prior knowledge and the newly introduced information. Second, the extraneous load is strongly linked to the way the information is presented. Finally, the germane load facilitates learning and schema construction by processing and understanding the material.

Neuroscientists have provided scientific evidence to explain the brain functions in relation to cognitive load. According to neuroscience, the working memory has a limited capacity and it can only retain (7±2 items for adults and 3 to 4 items for young learners). This information is very crucial for learning in general to avoid cognitive overload. In other words, teachers can design materials that can reduce extraneous load and enhance intrinsic load, making learning more effective. In addition to this , by scaffolding learners , teachers can deal successfully with cognitive load management , to process more complex tasks gradually. Therefore, teachers should break down complex materials and structures into smaller, manageable units to suit young learners’ working memory capacity.

3-Dichotic Listening

Dichotic listening experiments examining how children respond to different auditory stimuli have been validated by neuroscience. They provide significant data about the mechanisms underlying attention, language acquisition and proficiency with early bilingual and multilingual children. Neuroscience findings have demonstrated brain lateralisation, with the left hemisphere generally being responsible in language processing for right-handed individuals.

Understanding dichotic, listening requires acknowledging a well-established neurological fact, i.e. the left hemisphere dominance for syllable and word processing. “Anything experienced on the right-hand side of the body is processed in the left hemisphere, and anything on the left side is processed in the right hemisphere” (Yule, 1985:164).

Multilingual children exhibit better cognitive flexibility with language processing as they switch their attention between different concepts and their meanings and the linguistic systems quickly and accurately. Bialystok & Martin (2004) argue that bilinguals demonstrate a good performance in dichotic listening tasks, providing evidence that children’s management skills with multiple languages enhance their selective attention to the auditory information.

4-Brain Plasticity

Concerning learning and memory, for a long time, it was believed that through adulthood, the connections in the brain became fixed. In fact, according to many recent studies, the brain never stops changing through learning. These brain changes occur mostly at the level of connections between neurons. Kassin (2008:109), professor of psychology points out that “Psychologists once believed that the neural circuits of the adult brain and nervous system were fully developed and no longer subject to change. Then in the 1980s and 1990s a series of provocative experiments showed that the adult brain has flexibility or plasticity- a capacity to change as a result of usage and experience”. Consequently, when a person becomes an expert in a specific domain, the brain areas that deal with the different skills related to this field will expand more.

Draganski et al. (2006), as cited in Michelon (2008) demonstrated that extensive learning of abstract information could stimulate some neuroplastic changes in the brain. They imaged the brains of German medical students before their exams and right after the exams. Students’ brains showed important changes in regions (parietal cortex as well as the posterior hippocampus) known to be involved in memory retrieval and learning. “Neuroplasticity or brain plasticity refers to the brain’s ability to change throughout life. The brain has the ability to reorganize itself by forming new connections between brain cells. In addition to genetic factors, the environment in which a person lives, as well as the actions of that person, play a role in plasticity” (Michelon, 2008:1)

Brain plasticity occurs in the brain:

-At the beginning of life.

-In case of brain injury: to compensate for lost functions.

-Through adulthood: whenever something new is learned and memorised.

5-Memory and Learning

According to neuroscience, understanding the different types of memory (working memory, long-term memory, and procedural memory) can help language teachers in task design. First, working memory is also called short-term memory, which is used for the storage of information for active use. In English language classes, this memory plays an important role in processing language structures. Teachers can design activities to help learners retain new information and applying it at the same time. Second, the long-term memory is where new knowledge is stored for longer periods. Thus, the repetition of new words, phrases, and structures is the best technique to transfer information from working memory to long-term memory. Third, procedural memory is directly connected to skills, such as speaking or writing, which is reinforced by practice. Teachers can include activities like writing paragraphs, role-playing, and dialogues to develop this third type of memory.

6-Neural Organization in Bilingualism and Multilingualism

The field of neuroscience has highlighted neuroplasticity that facilitates the brain’s adaptation to multiple linguistic systems. Therefore, early bilingualism and multilingualism enhance the brain’s capacity to process

multiple languages and benefit from these multiple complex mechanisms.

In recent years, functional techniques for measuring brain activity have shed new light on the neural organization in bilingual and multilingual individuals. Thus**,** neuroscientists reached a consensus concerning these issues. In fact, the first language and other languages learned later are processed with the same neural devices and mechanisms (Perani & Abutalebi, 2005). However, the neural differences in L1 and L2 and subsequent language representations vary according to the age of acquisition, the degree of mastery (or the level of proficiency), the level of exposure and the manner of acquisition (implicit or explicit language learning) (Friederici, 2006).

7-Chomsky's Theory of Universal Grammar and Multilingualism from a Neuroscience perspective

Chomsky's theory of Universal Grammar (UG) posits that humans have the innate capacity to acquire language and that all languages share a common structural basis', which he called Universal Grammar. Accordingly, multilingual learners can use their understanding of grammatical structures in one language to facilitate the learning of others (Chomsky, 1986).

From a neuroscience perspective, Broca's area can help multilingual learners produce grammatically correct language while switching from one language to another. This implies that the neural mechanisms that are responsible for understanding grammar and producing correct sentences are facilitating multilingual communication.

Multilingual learners can produce accurate sentences in a second or third language but face difficulties with vocabulary and pragmatic nuances. Therefore, learners need to learn grammar and vocabulary in an authentic context. In other words, grammatical fluency alone does not always lead to meaningful communication.

8-Speech Delay and language disorder

It is widely recognised that all children are born with some ability to communicate. However, for some children, the development of speech and language skills may be difficult. In general, a child is considered to have speech delay if 'his/her speech development is significantly below the norms compared to other children of the same age' (Leung, 1999: 3)

According to Bernal & Altman (2003), children with unusual delayed speech tend to listen with the right side of the brain rather than the left hemisphere. This brain activity is qualified as being abnormal compared to children with normal speech development. This research represents the first time functional magnetic resonance imaging (fMRI) has been used to investigate brain activity related to speech delay. The findings indicate that children with seriously delayed speech have higher levels of right brain lobe activity than children without delayed speech, who use the left side of the brain when they listen. It is revealed that children with delayed speech have less brain activation than the typically developing ones, indicating that speech-delayed children are less receptive to language than their peers are. Dr Altman emphasizes the importance of early identification of children with speech-delayed brain patterns, so that appropriate interventions can be started early (Bernal & Altman (2003).

Other causes of speech delay

- Hearing loss
- Mental retardation
- Bilingualism (two languages are spoken in the child's home).
- Psychosocial deprivation (deprived of social contact).
- Autism (a neurodevelopmental condition).
- Selective mutism (the child does not want to talk).
- Cerebral palsy (a movement disorder caused by brain damage).

9-Dyslexia

Dyslexia is a learning disability that affects the brain's processing functions involved in reading written language. "Dyslexia is a complex disorder associated with reading difficulty despite adequate reading instruction. Neuro-imaging research suggests that dyslexia is associated with differences in a network of regions implicated in typical reading development". (D'Mello & Gabrieli, 2018:805). Therefore, early diagnosis, adequate support and the use of assistive techniques through close collaboration between teachers and professionals can help individuals with this learning disability to improve skills and build confidence .

Implications of neuroscience for language learning classes

Therefore, neuroscience has the following considerable implications for language learning classes:

1. Neuroscientists support the concept of critical period or the sensitive period for language learning. This implies that children can easily acquire languages and can achieve native-like fluency through natural exposure to authentic input.

2. Neuroscience recognises the brain's capacity to create new neural connections and this implies that language learning can occur at any age.

3. The findings show that bilingualism can boost cognitive functions beyond language proficiency such as problem solving and flexibility.

4. Syllabus designers can explore the information about different types of memory by including techniques that enhance memory retention, such as spaced repetition.

5. Language teachers should incorporate emotional engagement through stories , movies and songs to enhance motivation and retention because emotions play an important role in learning.

6. Multisensory Learning can also be incorporated in language learning through visual, auditory, and kinaesthetic elements to create engaging learning experiences.

7. Social interaction in language learning is emphasised by neuroscience research. Consequently, conversations and collaborative learning can stimulate brain neural connections that are associated with language processing.

8. Neuroscience highlights individual learning differences, as unique neural connections are created according to different language processing models. Consequently, the integration of adaptive technologies (such as applications and online platforms) to design personalised materials that accommodate individual learning styles and strategies.

9. Immediate and constructive feedback stimulates the brain's neurobiological responses and promotes faster language learning.

Finally, language teachers can explore neuroscience by adjusting their teaching methods, making them more effective and personalised to the needs of learners.

Research Design and Methodology

This research relied on a questionnaire that was distributed to primary school teachers. The questionnaire is divided into five sections. The first section deals with 'Demographic Information' or the collection of data about age, gender, teaching experience and level of education, In Section 2, the emphasis is on teachers' awareness of neuroscience findings. The third section focuses on the 'Application of Neuroscience Findings in Teaching'. In other words, this part evaluates teachers' application of these findings in their language classes. Section 4, "Challenges and Support" consists of questions that seek to know the challenges that teachers face in this multilingual context and the type of support they expect from the field of neuroscience to deal with everyday problems in their classes.

General Findings

Section 1: Demographic Information

B.Age Distribution Q2: Specify your age

Table 1: Teachers 'Age Distribution

responses	20-45	45-5o	over 50
participants	30	28	9
percentages	44,77	41,69	13,43

Knowing participants' age is an important variable in this research. As shown on table 1, 44, 77 % (N=30) of the participants belong to first age range, which is between 20-45 years old. The second group, which accounts for 41, 69% (N=28) of the participants, belongs to the second age range (45-50). Besides, the last group represents a percentage of 13.43 %(N=9) and fits in the last age category, which is over 50 years old.

A-Gender Distribution

Table 2: Gender Distribution

responses	females	males
participants	48	19
percentages	71.64	28.35

The results on the table display the gender of the informants .Accordingly, the majority of the participants are females (71.64%)(N=48) and 28.36 % (N=19) are males. Knowing the gender of the informants is necessary for the present research as it can affect their views and their teaching practices.

C-Teaching Experience

B. Q2: Indicate your teaching experience

Table 3: Teachers' Professional Experience

responses	1-5	5-10	more than 10
participants	45	13	9
percentages	67,16%	19,40%	13,43%

The participants' teaching experience is displayed on table 3. Accordingly, it indicates that 67.16 %(N=45) of the respondents have (1 to 5 years) teaching experience. Furthermore, the second group (19, 40 %)(N=13) has between 5- 10 years of teaching experience. The third category (13.43%) (N=9) possesses an extensive teaching experience (more than 10 years).

C- Participants 'Academic background

B. Q2: Indicate your academic attainment

Table 4: Teachers' Academic Background

responses	licence	master	doctorate
participants	7	57	3
percentages	10.44%	85.07%	4.47%

Participants 'Academic background

The table demonstrates that participants with Master's degree represent the majority of the total sample (85.07%) (n = 57). In contrast, individuals with a licence degree hold the second portion with 10.44% (n = 7), while those with the Doctoral level **(**4.47%) (n=3) constitute a minority. This indicates that almost all respondents possess advanced academic qualifications, and this can significantly have an

effect on their perspectives and responses.

Section 2 Teachers' Awareness of Neuroscience Findings.

Q1: Do you have some knowledge about neuroscience?

Table 5: Teachers' Familiarity with the Field of Neuroscience

Response	Yes	No
Participants	67	0
Percentages	100%	0%

The results indicate that 100% (N=67) of the teachers gave a positive answer, claiming that they have some knowledge about neuroscience. However 0% (N=0) of the sample crossed the 'No' answer. The sample demonstrates a good understanding of the field.

Q2: Specify the familiar areas of the field of neuroscience.

Table 6: Participants' Familiar Areas of the Field of Neuroscience.

Areas of the Field of Neuroscience.	Number of Answers	Percentage of Answers
Neuroplasticity	67	100%
Dichotic listening	10	14.92%
Speech delay	67	100%
Cognitive overload	67	100%
Critical period	20	29.85%
Dyslexia	67	100%

Based on the reported data, it is clear that all participants (100%) (N=67) are familiar with the concept of neuroplasticity. Furthermore, 100% (N=67) of the teachers 'answers show a strong understanding of the second concept related to language learning disorder (speech delay) , and this option received an equal number of responses (100%) . Moreover, the entire sample (100%)(N=67) is aware about the cognitive overload problem .In contrast, dichotic listening received 14.92 % (N=10) of the responses. Additionally, 29.85%(N=20) of the participants selected the 'critical period' option. Besides, it is clear from the table that the sample is also aware of the concept of dyslexia (100%) (n=67). In general, these findings demonstrate a deep understanding of core neurodevelopmental concepts among the surveyed teachers.

Section 3: Application of Neuroscience Findings in Teaching.

2-Do you apply your knowledge of neuroscience in your class?

Table 7: Teachers' Application of their knowledge of Neuroscience in the Class.

Response	Yes	No
Participants	60	7
Percentages	89.55%	10,45%

The results of the questionnaire indicate that the majority of the participants (89.55%) (N=60) actively apply their knowledge of the neuroscience field in their language classes. Conversely, the rest of the sample (10.45%)(N=7) gave a negative reply, or they do not utilize this knowledge in their instructional practices.

3-Do your learners experience cognitive overload during English lessons?

Table8: Teachers 'views about Learners' Experience of Cognitive Overload during English Lessons

Response	Yes	No
Participants	67	0
Percentages	100%	0%

All participants (100%)(N=67) gave a positive answer as their learners experience cognitive overload during English lessons. In contrast, 0%(N=0), as shown in the table, they selected the 'No' option demonstrating a total consensus among the participants regarding this issue.

4- What are the strategies that you use to manage your learners' cognitive load in your classes? Select one of the following options:

Table 9: Teachers' Strategies to deal with cognitive overload

Strategies to deal with cognitive overload	participants	percentages
Breaking tasks into smaller units	67	100%
Using visual aids	67	100%
Providing clear instructions	67	100%
Incorporating games and interactive activities	67	100%
collaborative learning ,using songs and other suitable materials	67	100%

Teachers successfully manage their learners' cognitive load in the classroom by the use of a variety of strategies. As indicated in their answers, all participants usually break the tasks into smaller parts to move from simple to complex .They always make sure that their young learners concentrate only on one specific language point at a time to prevent cognitive overload and ensure language improvements. Moreover, 100%(N=67) of teachers also reported their use of visual aids to clarify instructions and language structures. In addition to this, 100%(N=67) of the teachers use verbal strategies as giving clear and simple instructions and using verbal cues (simple language and examples). This diminishes misunderstanding and helps young learners to assimilate the content of the lesson rapidly. Besides, games and interactive activities are the most effective materials to make learning engaging and enjoyable as selected by 100%(N=67) of the respondents. This strategy reduces cognitive overload and promotes active participation. Moreover, 100%(N=67) of the participants reported their reliance on collaborative learning, using songs and other suitable materials to enhance interaction to discuss ideas and support learning by supportive learning environment to enhance learners' comprehension and retention.

5-Do you think that children can learn easily the different languages because of the Critical Period?

-Explain in both cases (with the Yes /No answers?

Table 10: Teachers' Opinions on the Critical Period Hypothesis

Response	Yes	No
Participants	41	26
percentages	61.19%	38.81%

A majority of the participants (61.19%)(N=41) signaled a positive opinion arguing that Algerian young learners are at the most favorable stage for language acquisition due to internet accessibility, particularly through social media platforms and the effects of globalization. Accordingly, this optimal biological stage would allow them to achieve fluency in English. To support this developmental phase, a clear majority emphasized the importance of natural exposure and an active integration of engaging, play-based materials such as songs and stories. They argued that maximizing auditory input during these crucial years directly correlates with higher proficiency levels. Conversely, 38.81(N=26) % of the sample expressed their complete dissatisfaction with the current situation, arguing that the early introduction of English adds further cognitive difficulties to mastering other core subjects taught in Algerian primary schools. For these participants, focusing on this developmental period is not a priority; instead, they viewed sustained motivation and active practice as the true driving factors in language development.

6-How do you apply Dichotic Listening in language classes?

The participants who supported the use of dichotic listening in language classes claimed that it could improve learners' listening skills. In fact, this technique helps to develop their ability to distinguish between French and English sounds, which is important for auditory skills and memorisation. They suggested the types of tasks that can be designed for daily practice such as listening to sentences to underline missing keywords or sounds. In general, these activities help in training children to increase their attention and their precision to notice phonological differences. On the other hand, another category of teachers highlighted the problem of the lack of adequate equipment in schools to practise different listening activities effectively.

7- How do you apply the concept of neuroplasticity or brain plasticity in language classes?

All the teachers reported that neuroplasticity can be applied in language classes by selecting engaging activities (e.g., visual, auditory, and kinaesthetic activities, repetitions, games ,and dialogues) to promote long-term retention. Additionally, creating a supportive environment can help very young learners to feel safe to take risks and learn from their errors. In other words, a continuous natural exposure is the key to creating new neural connections.

Moreover, the following views were the most prominent in their answers

Young and motivated learners naturally acquire languages more easily

Learners' brains can adapt to the learning environments

In workshops, learners learn by moving

Learners love role-play activities and songs

8-Do you have cases of children with speech delay in your class? How do you deal with them? (Use the options below)

1. By using gestures and visual supports to improve communication.
2. **B)** By providing extra time for them during lessons.
3. **C)** Working with speech therapists and external professionals (if they are available).

100 %(N=67) of the teachers declared that they usually have children who suffer from speech delay and language problems in their classes. Consequently, personalised learning is the solution to support them with their specific needs by the use of gestures and visual supports to improve communication and inclusion. Another group of the participants 22.38(N=15) denounced the absence of speech therapists or professionals to train this category of learners by the use of techniques to help them with speech disorders. Finally, the last group of the participants 32.83(N=22) deplored their lack of specific training in dealing with speech delays or language disorders, but they can only provide extra time for them during lessons.

9-Are there learners in your class who consistently struggle with reading /spelling/writing words despite normal instruction?

Rate the frequency of this occurrence) (choose from the following options):

Never (0% of the class)

Rarely (Isolated incidents, easily resolved)/

Sometimes (A few learners struggle from time to time)

Always (Some learners struggle regularly)

Regarding the literacy difficulties, the data indicate that a substantial majority of the respondents encounters students with core literacy skills. Precisely, (100%) (N=67) of the participants reported that some learners struggle regularly with reading /spelling/writing words despite normal instruction ,they crossed ("Always"). Additionally, (0 %) (N=0) noted that such difficulties are rare and easily resolved (Rarely). Besides, (0 %) (N=0) of the sample indicated that they never encounter these struggles .These findings suggest that reading, spelling, and writing difficulties are a persistent challenge in Algerian primary

classrooms, even under standard instructional conditions.

10. Do you have an adequate training to confidently determine if a student in your class has dyslexia? Yes/No/ Somewhat (Provide more explanations on how these cases can be recognised)

The participants' answers show a range of confidence levels when dealing with dyslexia. Only a few teachers (N=3) (4.47) feel that are trained enough; however, the rest of the sample (N=63) (94.02) is only able to identify some visible signs of dyslexia and prefer to orient the learners 'parents to specialists. Overall, the answers suggest that many educators do not see themselves as qualified professionals to effectively diagnose dyslexia and provide professional assistance, even if they can recognize only basic symptoms.

These are common ways how these cases are recognised as reported by teachers

- *Some learners face difficulties in learning certain letters*
- *They have problems with two words that differ by a single sound.*
- *They confuse words that share the same ending sound*
- *They find difficulties in reading words, even after an intensive practice*
- *They are unable to memorise letters, even at the end of the school year*
- *They spell words incorrectly by omitting or adding letters*

Section 4: Challenges and Support

Q1:**Do you think that children can easily learn their mother tongue,L1 ,L2 and the foreign language? Why?**

100%(N=67) of the teachers expressed their negative views, noting that the majority of children encounter difficulties in learning four languages - their mother tongue (Tamazight or Berber) (L1 (Arabic), L2 (French) and the foreign language (English). This is due to various reasons such as language interference (confusing spelling, grammar, and different structures in French and English). Moreover, learners, at an early age, exhibit individual differences and they use different styles and strategies.

These are the additional collected views:

Children find difficulties in memorising the different linguistic systems at an early age

Tamazight is transcribed using the international phonetic system in some books

All these languages have their specific vocabulary

The differences between the mother tongue used at home and the one taught at school

2. What type of support would help you better integrate neuroscience findings into your teaching?

- Professional training workshops
- Access to research articles
- Collaboration with specialists in psychology and neuroscience
- Other (please specify _____

All the participants (100%) (N=67) fully acknowledged the contribution of neuroscience in their teaching and they claimed that additional training workshops can help them more with their teaching practices. Moreover, all the complete sample (100%) reported that reading more research articles would help them to integrate neuroscience findings to diagnose some types of language learning disorders and deal with them. Similarly, all respondents (100%) agreed that the situation of early multilingualism is not easy for specific groups of children who suffer from language deficiency or cognitive delays. Therefore, speech therapist and psychologists are needed to provide these learners with specialised support if necessary.

General Conclusion

The present investigation into teachers' awareness and application of neuroscience findings in their English teaching practices presents several key insights into the field of foreign language learning in the Algerian primary schools. A significant majority of the participants (100%)(N=67) reported having some knowledge of neuroscience. Therefore, this demonstrates a strong awareness of the field. Moreover, the familiarity with specific areas such as neuroplasticity, speech delay, and dyslexia was also verified as 100% (N=67) of the respondents recognized these concepts. However, lower levels of awareness were reported regarding dichotic listening and the critical period hypothesis. Additionally, the majority of teachers (100%) (N=67) reported an active application of their neuroscience knowledge in their classrooms with young learners, which is a positive professional indicator of a good connection between neuroscience and educational practices. Furthermore, the entire sample (100%)(N=67) (according to the displayed data) is familiar with the concept of cognitive load, and they admitted that their learners experience this phenomenon during lessons. This awareness is fundamental, as any mental overload can affect negatively the process of learning. Therefore, managing the child’s information capacity is crucial as teachers need to deploy a variety of strategies, including breaking tasks into smaller learning stages, using visual aids, giving clear and simple instructions, and incorporating games and interactive activities to enhance young learners’ engagement and participation. In conclusion, the findings revealed a strong awareness and application of neuroscience findings among teachers. However, the reported gap concerning some concepts calls for further professional training in neuroscience to improve educational outcomes of the young learners in the Algerian multilingual learning environment.

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