

Cognitive Perspectives on Language Acquisition: Evaluating Skills, Adaptation, and Challenges in Adult Learning

Bushra A. B. Abdelrahman^{1*}, Machalla M. A. Megaiah²

¹Department of Applied linguistics, The Libyan Academy for Postgraduate Studies al-Jabal al-Akhdar Campus, AL Bayda, Libya

² Department of English Faculty of Arts, Tobruk University, Libya

*Email: Bushra.abdelrahman@omu.edu.ly

الجوانب المعرفية حول اكتساب اللغة: تقييم المهارات، التكيف، والتحديات في تعلم الكبار

بشرى عبد الرحمن بركة عبد الرحمن^{1*}، ماشاء الله مغيب عبد الله مغيب²
¹ قسم علم اللغة التطبيقي، الأكاديمية الليبية للدراسات العليا، فرع الجبل الأخضر، البيضاء، ليبيا
² قسم اللغة الانجليزية، كلية الآداب، جامعة طبرق، ليبيا

Received: 28-04-2026	Accepted: 27-06-2026	Published: 07-07-2026
		
Copyright: © 2026 by the authors. This article is an open-access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).		

Abstract

This study aims to develop effective learning strategies by understanding what cognitive skills are most critical for successful language acquisition in adult learners, and overcome difficulties and challenges faced by adult learners to enhance their language learning outcomes. Aging can affect various aspects of language ability, older individuals may experience difficulty in processing complex grammatical structures, or retrieving specific vocabulary. Unlike children, who typically acquire languages implicitly, adults have to employ explicit strategies that require conscious effort and deliberate practice. This study will investigate how cognitive abilities facilitate either facilitate or impede language acquisition in adults. Two groups of students were selected to carry out a quantitative descriptive-comparative study on understanding adult language acquisition from a cognitive perspective. The activities and results obtained in both groups were contrasted in order to determine if second language acquisition in adulthood is complex and influenced significantly by cognitive strategies or not. It can be stated that the result emphasize the importance of creating a supportive learning environment that gradually introduces innovative activities while addressing learners' emotional needs, and that adult learners differ in their ability to adapt to non-traditional or developed instructional activities, It also confirms that emotional and psychological factors, particularly anxiety and self-perception, are as important as cognitive factors in adult foreign language learning. Overall, this research bridges theoretical perspectives and practical applications, contributing to a deeper understanding of how adults acquire, adapt to, and retain language skills in diverse learning contexts.

Keywords: Adult learners, cognitive strategies, language acquisition, adaptation, learning challenges.

المخلص

تهدف هذه الدراسة إلى تطوير استراتيجيات تعلم فعّالة من خلال فهم ما هي المهارات الإدراكية الأكثر أهمية لاكتساب اللغة بنجاح لدى البالغين، وتجاوز الصعوبات والتحديات التي يواجهها المتعلمون البالغون لتعزيز نتائجهم في تعلم اللغة. يمكن أن يؤثر التقدم في العمر على جوانب مختلفة من القدرة اللغوية، حيث أنه قد يواجه الأفراد الأكبر سناً صعوبة في معالجة الهياكل النحوية المعقدة، أو استرجاع المفردات المحددة. على عكس الأطفال الذين يكتسبون اللغات عادة بشكل ضمني، يتعين على البالغين استخدام استراتيجيات صريحة تتطلب جهداً واعياً وممارسة متعمدة. ستبحث هذه الدراسة كيف يمكن أن القدرات الإدراكية تسهل أو تعيق تعلم اللغة عند البالغين، تم اختيار مجموعتين من الطلاب لإجراء دراسة كمية وصفية مقارنة لفهم اكتساب اللغة عند البالغين من منظور إدراكي. وتمت مقارنة الأنشطة والنتائج التي تم الحصول عليها في كلتا المجموعتين من أجل تحديد ما إذا كان اكتساب اللغة الثانية في مرحلة عمرية متقدمة معقداً ويتأثر بشكل كبير بالاستراتيجيات المعرفية أو لا. يمكن القول إن النتائج تؤكد أهمية خلق بيئة تعلم داعمة تقوم تدريجياً بتقديم أنشطة مبتكرة مع مراعاة الاحتياجات العاطفية للمتعلمين، وأن المتعلمين البالغين يختلفون في قدرتهم على التكيف مع الأنشطة التعليمية غير التقليدية أو المطورة. كما تؤكد النتائج أن العوامل العاطفية والنفسية، خصوصاً القلق وإدراك الذات، مهمة بنفس قدر العوامل الإدراكية في تعلم اللغة الأجنبية لدى البالغين. بشكل عام، هذا البحث يجمع بين المنظورات النظرية والتطبيقات العملية، مما يساهم في فهم أعمق لكيفية اكتساب البالغين للغة وتكيفهم معها واحتفاظهم بمهاراتها في سياقات تعلم متنوعة.

الكلمات المفتاحية: المتعلمون البالغون، الاستراتيجيات المعرفية، اكتساب اللغة، التكيف، تحديات التعلم.

1.Introduction :

Understanding how adults process, organize, and adapt to linguistic input is therefore essential for effective language learning. Cognitive perspectives emphasize the role of mental processes such as working memory, attention control, and executive functioning in language learning. So it is worthy to say that Understanding these cognitive perspectives is essential for refining educational strategies tailored to the unique needs of adult learners. They often face additional challenges, including increased cognitive load, anxiety, and limited opportunities for practice, which may negatively affect language development if not adequately addressed. As stated by (Naveh-Benjamin, 2000) "Older adults are less able to create and retrieve links between units of information, even when memory for the individual units remains relatively intact."

This study addresses this gap by investigating cognitive perspectives on adult language acquisition, with particular attention to cognitive skills, adaptation strategies, and learning challenges. By linking cognitive theory with instructional practice, the study aims to provide insights that can support educators in designing more effective learning environments for adult language learners.

In summary, understanding the cognitive mechanisms underlying adult language acquisition is essential for developing effective pedagogical practices and support systems.

1. Statement of the problem :

This study seeks to address a critical gap in the understanding of adult language acquisition from a cognitive standpoint. While language learning in children has been widely studied, adult learners encounter unique cognitive obstacles, such as diminished neuroplasticity, slower information processing, and memory constraints. These factors impede their ability to acquire

new linguistic skills and navigate complex language structures. "The critical period hypothesis is one of the prominent hypotheses. This hypothesis is premised on the belief that there is a certain age during which learners can learn a second language easily and achieve native-like competence." (Mosaffa Jahromi & Mobaraki, 2019) The research focuses on examining the cognitive processes involved in adult language learning, emphasizing the skills, adaptations, and challenges that are specific to this group, with the goal of enhancing language teaching methods and learning strategies for adults.

3. Research questions:

1. What cognitive strategies are most frequently used by adult language learners?
2. What are the main cognitive challenges perceived by adult language learners?
3. Are there statistically significant differences between traditional instruction and technology-enhanced instruction groups in cognitive strategy use, perceived challenges, and foreign language anxiety?

4. Objectives:

This study aims to:

- 1- Develop effective learning strategies, by understanding what cognitive skills are most critical for successful language acquisition in adult learners .
- 2- Overcome difficulties and challenges faced by adult learners to enhance their language learning outcomes.

5. Limitations of the Study:

This study faced several limitations that may have influenced the interpretation and generalizability of its findings. The most prominent limitation was that the study was restricted to postgraduate students, which makes it difficult to generalize the findings to learners with lower academic achievement levels. Additionally, some learners in the traditional instruction group experienced difficulties adapting to advanced instructional methods, which resulted in a preference for a more conventional classroom format. Furthermore, participants' responses showed a tendency toward certain response categories, particularly "Agree" and "Disagree," which may have contributed to an uneven distribution of data. Nevertheless, the data collection instruments used in this study were well-established, reliable, and appropriate for achieving the objectives of the research.

6. Literature Review :

2. Many previous studies have addressed the topic of adult learning and examined it from different perspectives. This literature review compiles key insights from a variety of studies, highlighting cognitive skills, adaptive strategies, and challenges encountered in adult language learning.

We can say that cognitive skills refer to the brain's essential functions used for learning, thinking, remembering, and problem solving. These abilities are crucial for acquiring any type of knowledge, particularly when learning a new language. Belikhir (2020) referred to cognition as "the process by which knowledge and understanding is developed in the mind." , While Kaur et al. (2023) proposed that "cognition and metacognitive skills deal with mental processes such as problem-solving, memory and decision-making.", and Moore (2020) offered a more comprehensive interpretation by explaining the primary cognitive skills, he claimed that it include : attention , memory ,processing speed, reasoning and logic, auditory and visual processing, and executive function. In the context of adult language learning, these cognitive

functions are fundamental for understanding and applying grammatical rules, retaining new vocabulary, comprehending spoken input, and expressing ideas effectively.

(Belkhir,2020) also mentioned that "cognitive means the use of conscious mental processes" that means in adult learning language , sensory input is selectively processed through attention , working memory , and processing speed to determine its relevance, and the irrelevant information is filtered out. While meaningful input is either retrieved from existing linguistic knowledge or processed through higher-order cognitive functions such as reasoning , and auditory and visual processing . With repeated practice, new language information is stored in long –term memory , leading to faster and more automatic language production.

Furthermore, Language learning styles refer to the cognitive approaches individuals use when acquiring a second language, including how they perceive, process, organize, and recall linguistic information. Wong and Nunan (2011) stated that “learners who have developed skills in learning how to learn will be better able to exploit classroom learning opportunities effectively.”, suggesting that awareness of one’s learning processes enhances academic success. Unlike factors of age, aptitude, or motivation, the role of learning styles in determining second language (L2) achievement remains inconclusive and highly dependent on social and instructional contexts.

Also , learning strategies—particularly cognitive and metacognitive strategies—have been more consistently associated with successful language learning. As Oxford (1990) said “Learning strategies are keys to greater autonomy and more meaningful learning.” Proficient adult learners tend to employ a variety of cognitive strategies, including repetition, organization, self-monitoring, and inferencing, with the understanding that such strategies can be taught and intentionally applied to improve learning outcomes. Building on this perspective, several studies have further examined adaptation strategies in adult language learning. Adaptation strategies refer to the techniques adult learners adopt to overcome personal, cognitive, or situational barriers in order to achieve their educational goals. Merriam and Bierema (2014) emphasize the importance of intrinsic motivation, arguing that adult learners must be internally motivated, actively engaged, reflective, and capable of applying new knowledge to future situations. Intrinsic motivation, therefore, enables adult learners to adapt more effectively to instructional demands and diverse learning environments.

Beyond cognitive and adaptive strategies, neurocognitive perspectives provide deeper insight into adult language acquisition. According to Purves et al. (2018), the brain is organized into neural systems that perform specialized functions, they are : The sensory systems which collect the information from internal and external stimuli, the motor systems which coordinate movement, and the associational systems which manage higher-order processes such as reasoning, planning, and decision-making. Although research continues to explore the complexity of these associational systems, understanding their function contributes significantly to educational practice. Moscovitch and Winocur (2002) argue that examining neurocognitive processes enhances our understanding of how individuals acquire, retain, and apply knowledge, while also informing interventions for cognitive and behavioral difficulties. Further support for this argument comes from Cabeza et al. (2011) who suggested that the adult brain retains the capacity to reorganize itself during language learning. The Compensation Hypothesis proposes that older adults may recruit additional neural resources or alternative pathways to compensate for age-related cognitive decline.

While early research focused primarily on general mechanisms of language acquisition, more recent studies have shifted attention toward the specific challenges affecting adult learners, One significant challenge is cross-linguistic interference, This idea is supported by Kroll and

Bialystok (2013) who explain that interference from a learner's first language (L1) can complicate second language (L2) acquisition. From the perspective of Cognitive Load Theory, such interference increases intrinsic cognitive load because learners must simultaneously manage similarities and differences between two linguistic systems. This additional mental effort may overwhelm working memory, leading to errors in pronunciation and grammar, and reducing overall fluency and comprehension. The need to control two active language systems places substantial cognitive demands on adult learners, highlighting the importance of strategic and instructional support.

Adult learners encounter various cognitive challenges that can affect their ability to acquire and process language. One of the most usual challenges they usually face is anxiety. Language anxiety is a widespread challenge among individuals learning a foreign language. While it affects many learners, it is especially prevalent among those with limited proficiency in the target language. This type of anxiety can have a profound impact on language acquisition, resulting in reduced motivation, lower proficiency, and decreased participation in classroom activities. Language anxiety refers to the fear and nervousness that learners experience while acquiring a new language. "One major affective factor that has received significant attention in the literature is language anxiety. Language anxiety has been shown to manifest in various forms, such as speaking anxiety and test anxiety, which can negatively impact learners" (Mubarak & Nurindah, 2023). It is a distressing emotional state characterized by tension, uneasiness, apprehension, and worry about uncertain outcomes. This anxiety is often accompanied by autonomic nervous system activation, leading to heightened physiological arousal. Fear of making mistakes or being judged can significantly hinder speaking practice. Another study conducted by Allwright and Bailey (1991) suggested that the higher anxiety levels lead to poorer speech performance. As a productive and interactive skill, speaking requires both confidence and active participation, making it particularly challenging for many language learners. One of the primary causes of speaking anxiety is the fear of making mistakes, as learners often worry about being criticized or perceived as unintelligent. This fear discourages participation, further impairing their speaking abilities. Since communication is essential for expressing ideas, developing strong communication skills is crucial for language learners. Another significant factor contributing to speaking anxiety is a lack of confidence in language abilities. This insecurity may arise from limited exposure to the target language, insufficient practice, or negative feedback from others. When learners doubt their ability to communicate effectively, they often experience heightened anxiety and may avoid speaking situations altogether.

6.1 Pedagogical Implications:

Marzano (2003) believes that Insights from cognitive and neurocognitive studies significantly impact language education. Understanding these implications helps educators' better support adult learners in enhancing engagement, motivation, and academic achievement. and Tomlinson (2011) claims that the Strategies that reduce cognitive load, such as adjusting instructional methods and materials to meet diverse learner needs, foster a supportive and motivating learning environment. Whereas Chapelle (2001) admit that Addressing affective challenges by considering varied abilities, learning styles, and backgrounds further enhances these efforts. Furthermore, technology-enhanced language learning tools, like computer-assisted language learning (CALL) systems, provide personalized and adaptive learning experiences. And Hattie (2009) explains that These tools not only boost cognitive engagement and motivation but also facilitate learners' progress through targeted feedback. By connecting

theoretical research with classroom practice, educators can effectively apply pedagogical principles to enhance learning outcomes.

“Teachers are facing greater challenges in teaching in the present educational system. They need to know what style of teaching is suitable for the students. Ultimately, the teacher needs to know or diagnose appropriate learning style for an individual or a group of students”(Padhy, 2012). This means when developing instructional methods, educators and trainers must consider how different learning styles affect individual students. To address diverse needs, they should incorporate a variety of teaching approaches. It is possible to argue that learning is not a mandatory process; rather, it is influenced by context. It does not occur instantly but evolves over time, building on prior knowledge and experiences. Therefore, learning should be understood as an ongoing process rather than simply the accumulation of facts and procedures. As Padhy (2012) suggests, there are three main ways through which individuals take in information: seeing, hearing, and touching. The sense a person uses most often determines their learning style: 1-Visual learners 2-Auditory learners 3-Tactile (or kinesthetic). He emphasizes that teachers must consider various limitations when selecting a teaching style, as the style should align with the class's ability to absorb and assimilate information, which can differ from group to group. Therefore, it is important for teachers to adapt their methods to the students' learning preferences. To ensure compatibility between teaching and learning styles, teachers must understand various learning theories. This awareness allows teachers to adjust their teaching approach to meet the needs of their student.

7. Theoretical Framework:

7.1 Cognitive Load Theory:

Cognitive Load Theory emphasizes the limits of working memory and its ability to process complex information at the same time. For adults when they learn a new language, the cognitive load tends to be greater, as they must process and absorb new grammar rules and vocabulary, which can be more challenging compared to younger learners. This theory explains the mental strain adults experience when trying to manage new language input while using it effectively. The Cognitive Load Theory was developed by John Sweller in the 1980s. It focuses on the limitations of working memory and how it can either hinder or enhance learning. The core idea of Cognitive Load Theory is that the human brain has a limited capacity for holding information in working memory. When too much new or complicated information is presented at once, this memory system can become overloaded, making it harder to understand and remember the material. CLT categorizes cognitive load into three types: intrinsic, extraneous, and germane. Intrinsic load is linked to the natural complexity of the content itself "Intrinsic cognitive load is determined by the complexity of the material and the learner's level of expertise." (Sweller et al., 2011, p. 57), whereas extraneous load arises from ineffective or confusing instructional design. And germane load refers to the mental effort directed toward processing, understanding, and integrating new information to build meaningful knowledge. However, to optimize learning, educators should aim to minimize extraneous cognitive load caused by poor instructional design and maximize germane load, which supports the mental processing and integration of new information.

7.2 Neuroplasticity Theory:

Merzenich and deCharms (1996) suggest that While neuroplasticity tends to decrease with age, adults still have the potential to adapt and form new neural pathways, allowing for language learning even later in life. This theory highlights how adults can overcome cognitive limitations, such as reduced flexibility in creating new linguistic patterns, through neural

adaptation. In addition to previous research on neurocognitive mechanisms, Puderbaugh and Emmady (2023) further explain neuroplasticity as a dynamic process that unfolds in three distinct phases. They note that during the first 48 hours following a brain injury, such as stroke or traumatic brain injury (TBI), primary damage may progress due to continued neuronal cell death, resulting in the disruption of specific cortical pathways. During this early stage, the brain attempts to compensate by activating secondary neural networks to preserve functionality. Over the following weeks, supportive cells become increasingly involved, and cortical pathways shift from inhibitory to excitatory activity. This period is marked by heightened synaptic plasticity and the formation of new neural connections. In the longer term, weeks to months after the injury, the brain continues to reorganize itself through axonal sprouting and structural remodeling around the affected areas. These findings further support the view that the adult brain retains a significant capacity for reorganization and adaptation.

whereas La Rosa, Parolisi, and Bonfanti (2020) explain neurogenic process as follow “By considering the whole neurogenic process across time, its rate is progressively reduced with age, and the reduction is greater and faster in large-brained mammals.”, in other words The older the brain, the slower it creates new neurons — and the bigger the brain, the faster this slowdown happens. Despite these findings, Merzenich and deCharms (1996) suggest that While neuroplasticity tends to decrease with age, adults still have the potential to adapt and form new neural pathways, allowing for language learning even later in life. This theory highlights how adults can overcome cognitive limitations, such as reduced flexibility in creating new linguistic patterns, through neural adaptation .

However ,This ongoing neural reorganization supports the view that adults remain capable of acquiring new languages, particularly when instructional approaches align with their cognitive capacities.

7.3 Andragogy theory:

Malcolm Knowles' Andragogy Theory offers a distinctive pedagogical framework based on self-directed learning, prior experience, and intrinsic motivation, making it an ideal model for effectively educating older learners. There is a persistent gap in applying this theory, as many educational programs continue to rely on traditional methods that may not fully address the unique needs of older adults.

Malcolm Knowles introduced this theory in 1968, it is a term popularized by Knowles which refers to the art and science of helping adults learn, He identified five key assumptions about adult learners which are : self-concept, Experience ,Problem-Centered Learning , readiness to learn, and motivation. Based on these assumptions, Knowles (2015) identified four key principles that enhance adult learning. First, adults should actively participate in shaping their learning process, including planning and evaluation. Second, their prior experiences serve as valuable resources, making case studies and real-world applications essential in instruction. Third, learning should be relevant, focusing on practical knowledge that directly applies to personal or professional settings. Lastly, a problem-solving approach is crucial, encouraging critical thinking rather than passive memorization.

In conclusion, taken together, the reviewed literature highlights the significant role of cognitive processes, neuroplasticity mechanisms, and adaptive strategies in shaping adult language acquisition. While several studies have identified cognitive constraints that may influence learning outcomes, the evidence also demonstrates the adult brain's capacity for adaptation and reorganization. This perspective underscores the need for research that moves beyond merely identifying cognitive limitations and instead emphasizes the practical strategies adult learners employ to overcome obstacles and achieve language proficiency. Accordingly,

further investigation is required to bridge theoretical cognitive insights with pedagogical applications that effectively support adult learners in diverse educational contexts.

Viewing these elements as integrated components is essential for understanding adult language learning processes. This perspective underscores the need for research that not only identifies cognitive limitations but also emphasizes practical strategies that adult learners use to overcome obstacles and achieve language proficiency.

Overall, the reviewed previous studies highlight the significant role of cognitive factors, learning strategies, and emotional aspects in shaping adult learners' language acquisition experiences. Previous research has demonstrated that cognitive skills, such as memory, attention, problem-solving, and strategic learning, contribute to successful language learning, while factors such as foreign language anxiety and adaptation difficulties may negatively influence learners' performance and participation. However, despite the valuable contributions of these studies, limited attention has been given to examining the relationship between cognitive abilities, adaptation strategies, and challenges among adult EFL learners, particularly in the Libyan context. Therefore, the present study seeks to address this gap by investigating cognitive perspectives on language acquisition, evaluating learners' cognitive skills, adaptation strategies, and challenges, and exploring the factors that influence adult learners' success in acquiring a foreign language.

8.Methods:

This study adopted a quantitative descriptive-comparative research design to investigate cognitive strategy use, perceived cognitive challenges, motivation, and foreign language classroom anxiety among adult EFL learners. A quantitative approach was employed to facilitate the systematic collection and statistical analysis of numerical data obtained through structured research instruments.

The descriptive component of the design was used to identify and describe adult learners' cognitive strategies, perceived challenges, motivation levels, and foreign language classroom anxiety. The comparative component was employed to examine differences between learners receiving traditional instruction and those participating in technology-enhanced instruction.

This research design was considered appropriate because it enabled the researcher to describe the characteristics of the study variables and to compare learners' responses across the two instructional environments. Consequently, it provided a comprehensive understanding of the cognitive and affective factors influencing adult foreign language learning.

8.1 Data Collection Instruments:

Data were collected using three quantitative research instruments designed to measure the study variables.

1. Language Learning Strategies and Perceived Challenges Questionnaire

A structured questionnaire was developed to assess adult learners' cognitive strategies, motivation, and perceived cognitive challenges encountered during foreign language learning. The questionnaire consisted of three sections:

Section 1: Cognitive Strategies

Section 2: Motivation

Section 3: Perceived Cognitive Challenges

The questionnaire employed a five-point Likert scale to facilitate quantitative analysis.

2. Foreign Language Classroom Anxiety Scale (FLCAS)

The Foreign Language Classroom Anxiety Scale (FLCAS), developed by Horwitz et al. (1986), was used to measure learners' levels of foreign language classroom anxiety. The scale consists

of 33 items rated on a five-point Likert scale. Reliability analysis yielded a Cronbach's alpha coefficient of 0.790, indicating good internal consistency and confirming that the instrument was appropriate for use in the present study.

3. Teacher Observation Checklist

A structured teacher observation checklist was used to collect quantitative data regarding learners' classroom behaviors and cognitive strategy use during the instructional period. The checklist consisted of predetermined indicators with fixed response categories, allowing the observation data to be analyzed quantitatively. The observation findings were used to support and complement the questionnaire results by providing additional evidence of learners' classroom behaviors.

All three instruments generated quantitative data and were administered once during the data collection phase. The collected data were subsequently coded and analyzed using appropriate statistical procedures to address the research questions and compare the traditional instruction group with the technology-enhanced instruction group.

8.2 Participants:

The study involved 50 adult learners aged between 30 and 50 years who were enrolled in English language courses at two language centers in Al-Bayda, Eastern Libya: the Language Center at Omar Al-Mukhtar University and Barakat Al-Rahman Private Language Center. Participants were selected based on the following criteria: they were adult learners within the specified age range, were enrolled in English language courses during the study period, and voluntarily agreed to participate in the research. All participants were informed about the purpose and procedures of the study, and informed consent was obtained prior to data collection.

The participants were assigned to two instructional groups according to the learning environment in which they were enrolled:

Traditional Instruction Group (n = 25): Learners attending Barakat Al-Rahman Private Language Center, where English was taught using conventional classroom instruction emphasizing grammar, vocabulary, and face-to-face communication.

Technology-Enhanced Instruction Group (n = 25): Learners attending the Language Center at Omar Al-Mukhtar University, where English instruction incorporated technological resources, digital learning materials, and interactive online tools to support language learning. Participants represented diverse educational backgrounds and enrolled in language learning for various purposes, including professional development, academic requirements, and preparation for postgraduate studies. Academic qualification was recorded as a demographic characteristic and was examined only as an additional exploratory variable rather than as the primary basis for group comparison.

8.3 Study Variables:

The study examined the following variables:

- Independent Variable::

The instructional method, represented by:

- Traditional instruction group.
- Technology-enhanced instruction group.

- Dependent Variables:

- Cognitive strategy use.
- Perceived cognitive challenges.
- Foreign language classroom anxiety.
- Perceived language learning outcomes.

Academic qualification was treated as a demographic variable and was examined only as an additional exploratory factor.

8.4 Procedure :

Following the completion of the instructional period, each participant completed the research questionnaires once during the data collection phase. The responses were collected and coded for statistical analysis.

The data were analyzed quantitatively to compare learners in the traditional instruction group and the technology-enhanced instruction group. The analysis examined differences in cognitive strategy use, motivation, perceived cognitive challenges, and foreign language classroom anxiety (FLCAS).

Furthermore, descriptive statistical analyses were conducted to identify the most frequently reported cognitive strategies and the primary cognitive challenges experienced by adult language learners. These procedures were designed to address the research questions and provide a systematic comparison between the two instructional environments.

8.4 Data Analysis:

The collected data were analyzed quantitatively using descriptive and inferential statistical procedures. Reliability analysis was conducted by calculating Cronbach's alpha coefficients for the research instruments to assess their internal consistency.

Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize participants' responses and identify the most frequently reported cognitive strategies, perceived cognitive challenges, motivation levels, and Foreign Language Classroom Anxiety Scale (FLCAS) scores.

The normality of the data was assessed using the Shapiro–Wilk test. Since the results indicated that the data were not normally distributed ($p < .05$), non-parametric statistical tests were employed. The Mann–Whitney U test was used to compare the traditional instruction group and the technology-enhanced instruction group with respect to cognitive strategy use, motivation, perceived obstacles, and FLCAS scores. Spearman's rank-order correlation was used to examine the relationships among the study variables.

9.Results & Discussion:

Statistical Report for the Analysis of Adult Language Acquisition Study:

This report presents a comprehensive analysis of the data related to the cognitive perspective of language acquisition, with a particular focus on the methodological and statistical aspects that ensure the accuracy, validity, and reliability of the research findings.

9.1. Methodology and Measurement Instruments:

The study relied on two main scales to collect data from a sample consisting of fifty (50) respondents. A five-point Likert scale was used to measure participants' responses, with scores ranging from (1) "Never / Strongly Disagree" to (5) "Always / Strongly Agree."

To ensure the accuracy of the results, composite measures were used by combining functionally related items to form the study dimensions as follows:

Methodological Justification	Items Used	Dimension
They represent direct mental tools for language processing	Repetition of words, rule chunking, visualization, and the use of mnemonic aids.	Cognitive Strategies

Integrating the psychological aspect (confidence) with the cognitive aspect (ease) to ensure measurement validity.	Confidence in the ability to achieve mastery + perception of learning ease/difficulty.	Perceived Linguistic Competence
Anxiety reflects “excessive cognitive load” that hinders acquisition.	Total scores of the FLCAS scale (33 items) + the perceived challenges checklist.	Cognitive Challenges and Anxiety

-Instrument Reliability (Cronbach’s Alpha)

The internal consistency of the instruments was verified using Cronbach’s alpha coefficient, and the results were as follows:

-First Questionnaire (Strategies and Motivation):

The reliability analysis indicated that the questionnaire obtained a Cronbach’s alpha coefficient of 0.591. Although this value is below the commonly recommended threshold of 0.70, it was considered acceptable for an exploratory study due to the limited number of items and the preliminary nature of the instrument. This limitation is acknowledged, and future studies are recommended to refine the questionnaire and evaluate the reliability of its individual subscales.

-Second Questionnaire (FLCAS – Anxiety Scale):

The Foreign Language Classroom Anxiety Scale (FLCAS), consisting of 33 items, yielded a Cronbach’s alpha coefficient of 0.790, indicating good reliability and satisfactory internal consistency. This result confirms that the instrument was appropriate for assessing foreign language classroom anxiety in the present study.

9.2. Testing Normality and Justification of the Statistical Methodology:

The Shapiro–Wilk test was conducted to examine the normality of data distribution. The results showed that the significance values (Sig.) for all variables were 0.000, which is less than 0.05. Based on this result, it was confirmed that the data do not follow a normal distribution. Due to the lack of normality, non-parametric tests were employed, as they are the most appropriate and accurate for handling ordinal data that do not meet the assumptions of normal distribution, thereby ensuring the validity of statistical inference.

9.3. Analysis of the Study Hypotheses

First Hypothesis (Between-Group Comparison):

“Adult learners with higher academic qualifications demonstrate greater use of explicit learning strategies.”

-Table (1): Mann–Whitney Test for Differences in Learning Strategies

Result	Significance Level (Sig.)	Z)Value	Dimension
Statistically significant	0.027	-2.213	Cognitive Strategies

The results indicate statistically significant differences in the use of cognitive strategies attributable to academic qualification, in favor of master's degree holders (Mean Rank = 26.05) compared to *bachelor's degree holders (Mean Rank = 17.74).

This finding **partially supports the hypothesis** that higher academic experience is associated with a more organized use of explicit strategies, which is reflected in improved language progress.

-Second Hypothesis (Correlation Relationship):

“The adaptation of cognitive strategies among adult learners is positively associated with their levels of linguistic competence.”

Table (2): Spearman's Correlation between Strategies and Linguistic Competence

Significance Level (Sig.)	Correlation Coefficient	Variables
0.003	0.410	Cognitive Strategies × Linguistic Competence

The results revealed a statistically significant positive correlation between cognitive strategies and perceived linguistic competence ($r = 0.410$, $p = 0.003$). Since the significance value ($p = 0.003$) is lower than the 0.01 significance level, the relationship is considered statistically significant. This finding indicates that greater use of cognitive strategies is associated with higher perceived linguistic competence and language mastery among adult learners. Therefore, the second hypothesis is accepted.

-Third Hypothesis (Prediction and Influence):

“Cognitive challenges and cognitive load significantly affect the success of language acquisition.”

Ordinal regression was used to predict the effect of challenges and anxiety (as independent variables) on acquisition success (as the dependent variable).

Table (3): Regression Model (Model Fitting)

Significance Level (Sig.)	Value	Indicator
0.000	184.795	Model Fitting (Chi-Square)
-	0.998	Nagelkerke R-Square

The Sig value (0.000) indicates that the predictive model is highly statistically significant. Additionally, the Nagelkerke value (0.998) suggests that the model demonstrated a very high explanatory power; however, this result should be interpreted cautiously due to the sample size and the number of predictors included.

This confirms the validity of the third hypothesis, showing that cognitive and psychological pressures constitute the main obstacles to successful language learning in adults .

-Interpretation of the Mann–Whitney Test Results

First: Dimension One (Learning Strategies)The results of the Mann–Whitney test revealed a statistically significant difference in the participants' responses according to academic qualification at the significance level of (0.05). The statistical significance value was Sig = 0.027, which is less than (0.05).

The rank table also showed that master's degree holders recorded the highest mean rank (26.05), indicating that their responses on the learning strategies dimension were higher compared to the other group.

This suggests that master's degree holders possess more advanced and well-organized learning strategies, which may be attributed to their academic experience and the nature of postgraduate studies that rely on self-directed planning, research, and cognitive organization.

Second: Dimension Two (Learning Motivation)

The results of the Mann–Whitney test indicated no statistically significant differences in the participants' responses according to academic qualification, as the statistical significance value was $Sig = 0.99$, which is greater than (0.05) .

Although the mean rank was higher for master's degree holders (21.5), this difference was not statistically significant. This indicates a similarity in learning motivation levels between the two groups, suggesting that motivation toward learning does not differ substantially based on academic qualification and may instead stem from shared personal or professional factors among the participants. There is a statistically significant difference in learning strategies in favor of master's degree holders.

-Analysis of Teachers' Observation Checklist :

The results of the observation checklist indicated a high degree of consistency between the two teachers' responses, reflecting a shared perception of learners' use of cognitive strategies during instruction. Overall, the teachers' responses were largely consistent across all observed cognitive strategies. Both teachers reported that self-correction and breaking down complex grammar rules were rarely observed. In contrast, the remaining strategies—including repetition, note-taking, visualization, translation, seeking clarification, peer interaction, and time management—were consistently marked as observed (Yes) by both teachers. This high level of agreement suggests that the observed patterns of strategy use were stable and not influenced by individual observer interpretation.

Regarding learners' engagement level, the observation checklist revealed converging perceptions between the two teachers. One teacher noted that while some learners were actively engaged—frequently asking and answering questions and participating in group discussions—others did not contribute at all. Similarly, the second teacher reported the presence of both actively engaged and passive participants within the same classroom. Taken together, these observations indicate a mixed level of learner engagement, with clear variation between highly participatory students and those who remained largely passive during classroom activities. With respect to challenges noted during instruction, both teachers reported that learners experienced difficulties, particularly with grammar. One teacher highlighted challenges related to grammar and listening skills, whereas the other indicated that students faced problems with grammar and pronunciation. In addition, the second teacher observed that many learners were uncomfortable with corrective feedback and showed a preference for avoiding correction. Overall, these findings suggest that grammar-related difficulties constitute a common challenge among learners, accompanied by issues in listening, pronunciation, and acceptance of error correction.

Finally, regarding other classroom observations, both teachers noted positive social behaviors among some learners. Specifically, they reported that several students were very helpful and provided support to their peers during classroom activities and group work. This reflects the presence of cooperative learning behaviors, which may contribute positively to the overall learning environment despite variations in individual engagement levels.

9.4. Results Related to Research Question 1

1. What cognitive strategies are most frequently used by adult language learners?

The findings from the teachers' observation checklist and questionnaire responses indicated that adult learners employed several cognitive strategies during language learning. The most

frequently observed strategies included repetition, note-taking, visualization, translation, seeking clarification, peer interaction, and time management. These findings suggest that adult learners tend to rely on practical cognitive strategies that support information processing, memory retention, and classroom interaction. However, strategies such as self-correction and breaking down complex grammar rules were less frequently observed. This indicates that while learners actively use some cognitive strategies, more advanced self-regulatory strategies may require further development.

9.5 Results Related to Research Question 2

2. What are the main cognitive challenges perceived by adult language learners?

The results revealed that adult learners experienced several cognitive and psychological challenges during language acquisition. According to the Foreign Language Classroom Anxiety Scale (FLCAS) and teachers' observations, major challenges included grammar difficulties, pronunciation problems, listening difficulties, and discomfort with corrective feedback. Furthermore, the ordinal regression analysis showed that cognitive challenges and anxiety significantly predicted language acquisition success (Sig. = 0.000, Nagelkerke R^2 = 0.998). These findings indicate that cognitive load and anxiety represent important barriers affecting adult learners' ability to acquire a new language effectively.

9.6 Results Related to Research Question 3

Are there statistically significant differences in cognitive strategy use and perceived challenges among adult learners according to their academic qualifications?

The Mann–Whitney U test revealed statistically significant differences in cognitive strategy use according to academic qualifications (Sig. = 0.027 < 0.05). The results showed that master's degree holders obtained a higher mean rank (26.05) compared with bachelor's degree holders (17.74), indicating that learners with higher academic qualifications demonstrated greater use of organized cognitive strategies. This finding suggests that advanced academic experience may contribute to the development of more effective learning strategies, including planning, self-regulation, and cognitive organization.

Regarding perceived challenges, the results indicated that cognitive challenges and anxiety significantly influenced language acquisition success. The ordinal regression analysis showed that the predictive model was statistically significant (Sig. = 0.000), with a high Nagelkerke R^2 value (0.998). This suggests that cognitive and psychological challenges play an important role in explaining differences in adult learners' language acquisition outcomes. However, this result should be interpreted cautiously due to the sample size and the number of predictors included in the model.

10 Discussion of Major Findings :

The findings of this study are consistent with previous research emphasizing the importance of cognitive strategies in adult language acquisition. The results demonstrated that adult learners who employed more organized cognitive strategies reported higher levels of perceived linguistic competence. In addition, statistically significant differences in cognitive strategy use were found according to academic qualification, with master's degree holders demonstrating significantly greater use of structured cognitive strategies than bachelor's degree holders. These findings support previous studies by Oxford (1990) and Wong and Nunan (2011), which emphasize the important role of cognitive and metacognitive strategies in facilitating successful language learning.

The findings also indicate that cognitive challenges and foreign language anxiety play a significant role in adult language acquisition. Ordinal regression analysis indicated that cognitive challenges and foreign language anxiety were significant predictors of language acquisition success, suggesting that excessive cognitive load and emotional factors may hinder the language learning process. These findings are consistent with previous research highlighting the negative effects of foreign language anxiety on learners' performance, confidence, and classroom participation.

Furthermore, the teachers' observation checklist revealed that adult learners frequently employed strategies such as repetition, note-taking, visualization, translation, seeking clarification, peer interaction, and time management. However, self-correction and breaking down complex grammar rules were observed considerably less frequently, indicating that higher-order self-regulatory strategies require further development.

Although adult learners may experience challenges related to cognitive load and foreign language anxiety, the findings suggest that these challenges can be reduced through the effective use of cognitive strategies, supportive classroom environments, and appropriate instructional practices. Creating learning environments that encourage active participation, provide constructive feedback, and promote strategic learning can enhance adult learners' confidence and improve language acquisition outcomes. Overall, these findings contribute to a better understanding of the cognitive factors influencing adult language acquisition and offer practical implications for language teachers, curriculum designers, and adult education practitioners.

11 Conclusions of the Study:

Based on the statistical analysis and discussion of the findings, several conclusions can be drawn.

First, cognitive strategies play a fundamental role in adult language acquisition. The findings indicate that learners who employed more organized cognitive strategies demonstrated higher levels of perceived linguistic competence, highlighting the importance of strategic learning and cognitive organization in successful language acquisition.

Second, statistically significant differences were found in the use of cognitive strategies according to academic qualification. Master's degree holders demonstrated greater use of structured cognitive strategies than bachelor's degree holders, suggesting that higher academic experience contributes to the development of more effective language learning strategies.

Third, cognitive challenges and foreign language anxiety were found to be significant predictors of language acquisition success. These findings indicate that excessive cognitive load and emotional factors may hinder adult learners' language learning process and should therefore be addressed through appropriate instructional practices.

Finally, the teachers' observation checklist showed that adult learners frequently employed practical cognitive strategies, including repetition, note-taking, visualization, translation, seeking clarification, peer interaction, and time management. However, higher-order self-regulatory strategies, such as self-correction and breaking down complex grammar rules, were observed less frequently, indicating the need to promote these skills in adult language instruction.

Overall, the study concludes that both cognitive and psychological factors influence adult language acquisition. Supporting learners through effective cognitive strategies, reducing foreign language anxiety, and creating supportive learning environments can contribute to more successful language learning outcomes.

References

- Allwright, D., & Bailey, K. M. (1991). *Focus on the language classroom: An introduction to classroom research for language teachers*. Cambridge University Press.
- Belkhir, S. (Ed.). (2020). *Cognition and language learning*. Cambridge Scholars Publishing.
- Cabeza, R., Anderson, N. D., Locantore, J. K., & McIntosh, A. R. (2011). Aging gracefully: Compensatory brain activity in high-performing older adults. *NeuroImage*, 17(3), 1394–1402.
- Chapelle, C. A. (2001). *Computer applications in second language acquisition: Foundations for teaching, testing, and research*. Cambridge University Press.
- Hattie, J. (2009). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. Routledge.
- Kaur, P., Kumar, H., & Kaushal, S. (2023). Technology-assisted language learning adaptive systems: A comprehensive review. *International Journal of Cognitive Computing in Engineering*, 4, 301–313. <https://doi.org/10.1016/j.ijcce.2023.09.002>
- Knowles, M. S., Holton, E. F., & Swanson, R. A. (2015). *The adult learner: The definitive classic in adult education and human resource development* (8th ed.). Routledge.
- Kroll, J. F., & Bialystok, E. (2013). Understanding the consequences of bilingualism for language processing and cognition. *Journal of Cognitive Psychology*, 25(5). <https://doi.org/10.1080/20445911.2013.799170>
- La Rosa, C., Parolisi, R., & Bonfanti, L. (2020). Brain structural plasticity: From adult neurogenesis to immature neurons [Mini review]. *Frontiers in Neuroscience*, 14, Article 75. <https://doi.org/10.3389/fnins.2020.00075>
- Marzano, R. J. (2003). *What works in schools: Translating research into action*. Association for Supervision and Curriculum Development.
- Merzenich, M. M., & deCharms, R. C. (1996). Neural representations, experience, and change. In T. E. Feinberg & M. J. Farah (Eds.), *Behavioral neurology and neuropsychology* (pp. 1–14). McGraw-Hill.
- Merriam, S. B., & Bierema, L. L. (2014). *Adult learning: Linking theory and practice*. Jossey-Bass.
- Moore, A. L. (2020). *LearningRx research results and client outcomes* (2020 ed.). Gibson Institute of Cognitive Research/LearningRx.
- Moscovitch, M., & Winocur, G. (2002). The neuropsychology of memory and aging. In D. T. Stuss & R. T. Knight (Eds.), *Principles of frontal lobe function* (pp. 328–341). Oxford University Press.
- Mubarak, H., & Nurindah. (2023). Overcoming affective factors in language learning: The role of motivation, anxiety, and self-confidence. *Transformatika: Jurnal Bahasa, Sastra, dan Pengajarannya*, 2(2), 1–10.
- Mosaffa Jahromi, A., & Mobaraki, M. (2019). The effects of sociolinguistic factors on learning English: A case study. *International Journal of Linguistics, Literature and Translation (IJLLT)*, 2(2), 127–133. <https://doi.org/10.32996/ijllt.2019.2.2.19>
- Naveh-Benjamin, M. (2000). Adult age differences in memory performance: Tests of an associative deficit hypothesis. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 26(5), 1170–1187. <https://doi.org/10.1037/0278-7393.26.5.1170>
- Oxford, R. L. (1990). *Language learning strategies: What every teacher should know*. Newbury House.
- Padhy, P. C. (2012). Pedagogical implications: Bridge between teaching & learning. *Journal of Business Management & Social Sciences Research*, 1(1), 31–36.
- Puderbaugh, M., & Emmady, P. D. (2023). Neuroplasticity. In *StatPearls*. <https://www.ncbi.nlm.nih.gov/books/NBK557811/>
- Purves, D., Augustine, G. J., Fitzpatrick, D., Hall, W. C., LaMantia, A.-S., Mooney, R. D., Platt, M. L., & White, L. E. (2018). *Neuroscience* (6th ed.). Oxford University Press.
- Sweller, J., Ayres, P., & Kalyuga, S. (2011). *Cognitive load theory*. Springer.

- Tomlinson, B. (2011). *Materials development in language teaching* (2nd ed.). Cambridge University Press.
- Wong, L. L. C., & Nunan, D. (2011). The learning styles and strategies of effective language learners. *System*, 39(2), 144–163. <https://doi.org/10.1016/j.system.2011.05.004>
- Rabab Abdul Kareem Al darasi, & Hanan Ajouida Said. (2026). The influence of absence of teacher's roles on EL students' learning (A Case Study of English Language Teachers of Primary Schools in AlBaida City). *Journal of Libyan Academy Bani Walid*, 2(2), 238–250. <https://doi.org/10.61952/jlabw.v2i2.519>
- Aisha Saad. (2026). The Use of Logical Connectors among Learners of French as a Foreign Language at the University of Benghazi: L'emploi des connecteurs logiques chez les apprenants de FLE à l'Université de Benghazi. *Journal of Libyan Academy Bani Walid*, 2(3), 88–100. Retrieved from <https://journals.labjournal.ly/index.php/Jlabw/article/view/569>
- Emran Ali Mohammed Alareefi. (2026). The Impact of Using Technology in English Language Teaching and Learning among First-Semester Students at the Faculty of Information Technology in Al Khums. *Journal of Libyan Academy Bani Walid*, 2(3), 159–172. <https://doi.org/10.61952/jlabw.v2i3.578>
- Amjad Bakir Albahlol Embarek. (2026). Accuracy and Fluency in Learning English as a Second Language: Towards Achieving Balance in Light of Learners' Needs. *Journal of Libyan Academy Bani Walid*, 2(3), 199–205. Retrieved from <https://journals.labjournal.ly/index.php/Jlabw/article/view/581>
- Rabha Hassan Hamed, & Ameen O. Saleh Almanafi. (2026). Error Correction Techniques in University-Level English Language Teaching: A Review of Strategies and Pedagogical Implications. *Journal of Libyan Academy Bani Walid*, 2(1), 593–603. <https://doi.org/10.61952/jlabw.v2i1.435>
- Hanaa Mohammad Zabiya. (2026). An Exploration of the EFL Teachers' Styles in Classroom Interaction at the Secondary Schools of Misurata. *Journal of Libyan Academy Bani Walid*, 2(1), 650–662. <https://doi.org/10.61952/jlabw.v2i1.445>
- Soad Alshibani Ahmed Altaeb. (2026). The Significance of In-Service Training in Developing EFL Teachers' Pedagogical Skills: A Reflective Qualitative Study of the CELTA Programme in the Libyan Context. *Journal of Libyan Academy Bani Walid*, 2(1), 640–649. <https://doi.org/10.61952/jlabw.v2i1.441>
- Ebtisam Fathe Egnejewa. (2025). Exploring the Gap between Libyan English as a Foreign Language Teachers' Beliefs and Teaching Practices in Primary Schools: A Case Study in Zliten, Libya. *Journal of Libyan Academy Bani Walid*, 1(4), 702–719. <https://doi.org/10.61952/jlabw.v1i4.341>
- Anwaar Omar Alashab. (2026). An investigation into EFL Students' Perceptions of AI-Assisted Academic Writing tools. *Journal of Libyan Academy Bani Walid*, 2(1), 523–538. <https://doi.org/10.61952/jlabw.v2i1.426>

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare that they have no conflict of interest.

Disclaimer/Publisher's Note: The statements, opinions, and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of **JLABW** and/or the editor(s). **JLABW** and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions, or products referred to in the content.