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FOREIGN LANGUAGE ACQUISITION AFTER 45: PRACTICAL ASPECTS OF MULTIMEDIA-ASSISTED LEARNING

Yiryna RUDNIEVA^{ID}

The integration of multimedia systems into foreign language education is widely acknowledged as an effective means of enriching learning experiences. Nevertheless, their adoption among adult learners aged 45 and older remains relatively limited. This study examines the extent to which existing multimedia tools meet the educational needs of this age group and identifies the barriers that hinder their successful use. The research was conducted with 75 participants aged 45–65, all actively enrolled in foreign language courses and with prior experience using self-education apps or online group learning platforms. Data were collected from three learner groups: Ukrainian participants attending language courses at V. Karazin Kharkiv National University, Spanish learners during the author's internship at the University of Cadiz (Spain), and Turkish learners from the Dialectic Educational Center, Istanbul. This investigation was undertaken within the framework of the 2025 “Bulles d’air” scholarship, awarded by the Free University of Brussels, in partnership with Professor Vincent Louis, a specialist in the didactics of French as a foreign language and intercultural communication.

The study employs a mixed-methods approach, combining quantitative (structured questionnaires) and qualitative (semi-structured interviews) data collection techniques. The findings reveal several key challenges faced by older learners in technology-assisted language learning. These include low levels of digital literacy, overly complex or unintuitive interfaces, insufficient scaffolding and teacher support, and cognitive overload caused by fast-paced gamified elements and unstructured progression pathways.

Despite these challenges, participants acknowledged the benefits of multimedia learning environments, such as flexible scheduling, access to authentic language materials, and opportunities for independent study. However, the results demonstrate that these platforms often fail to accommodate the cognitive, motivational, and technological needs of learners aged 45 and older.

The study concludes that multimedia-based language learning systems should be redesigned with age-friendly features and an improved pedagogical structure. Recommendations include offering digital literacy training, simplifying user interfaces, slowing down gamified content, and integrating elements of traditional classroom methods to enhance learner confidence and engagement. Future research should investigate long-term patterns of multimedia adoption among older learners and explore strategies for optimizing their experience in technology-enhanced foreign language education.

Keywords: adult learners, digital literacy, foreign language education, multimedia learning, language learning, students aged 45 and older.



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ВИВЧЕННЯ ІНОЗЕМНОЇ МОВИ ПІСЛЯ 45 РОКІВ: ПРАКТИЧНІ АСПЕКТИ МУЛЬТИМЕДІЙНОГО НАВЧАННЯ

Ірина РУДНЄВА

Інтеграція мультимедійних систем у процес навчання іноземних мов широко визнається ефективним засобом збагачення освітнього досвіду. Водночас їх використання серед дорослих віком від 45 років залишається обмеженим. У даному дослідженні проаналізовано, наскільки наявні мультимедійні інструменти відповідають освітнім потребам цієї вікової групи, а також визначено бар'єри, що перешкоджають їх успішному застосуванню. Дослідження охопило 75 респондентів віком 45–65 років, які активно відвідували курси іноземних мов та мали досвід використання додатків для самоосвіти й онлайн-платформ для групового навчання. Дані було зібрано серед трьох груп слухачів: українських учасників мовних курсів при Харківському національному університеті імені В. Н. Каразіна, іспанських слухачів під час стажування авторки в Кадіському університеті (Іспанія) та турецьких слухачів із Освітнього центру *Dialectic*, Стамбул. Дослідження здійснено в межах стипендіальної програми “*Bulles d'air*” (2025), наданої Вільним університетом Брюсселя у співпраці з професором Вінсентом Луї, фахівцем із дидактики французької мови як іноземної та міжкультурної комунікації.

Методологія ґрунтується на поєднанні кількісних (структуровані анкети) та якісних (напівструктуровані інтерв'ю) методів збору даних. Результати виявили низку ключових труднощів, з якими стикаються дорослі у процесі використання технологій для вивчення іноземних мов. Серед них: низький рівень цифрової грамотності, складні або незрозумілі (неінтуїтивні) для споживача інтерфейси, недостатня підтримка викладача та когнітивне перевантаження, спричинене швидким темпом змін ігрових елементів та неструктурованими підходами до подання інформації та перевірки знань.

Попри наявні труднощі, учасники опитування відзначили позитивні сторони мультимедійного навчального середовища, зокрема гнучкість у плануванні, доступ до автентичних мовних матеріалів та можливість самостійного навчання. Проте результати свідчать, що наявні платформи часто не враховують когнітивні, мотиваційні та технологічні потреби саме слухачів віком 45+.

У висновках наголошено на необхідності адаптації мультимедійних систем вивчення мов до потреб цієї вікової групи. Рекомендації включають створення віково-дружніх цифрових інструментів, проведення програм із підвищення цифрової грамотності, спрощення інтерфейсів, уповільнення темпу гейміфікованого контенту та інтеграцію елементів традиційного навчання для підвищення впевненості й залученості слухачів. Подальші дослідження мають вивчати довгострокові тенденції використання мультимедіа старшими учнями та стратегії оптимізації їхнього досвіду у технологічно підтримуваному вивченні іноземних мов.

Ключові слова: старші / дорослі учні, цифрова грамотність, вивчення іноземних мов, мультимедійне навчання, студенти віком 45+.

General statement of the problem and its connection with important scientific or practical tasks. In the digital age, multimedia technologies have become an indispensable component of education, reshaping traditional teaching methodologies and significantly enhancing accessibility for learners across all age groups. Foreign language acquisition, in particular, has greatly benefited from the integration of digital tools, which provide interactive, immersive, and highly

personalized learning experiences. The proliferation of mobile applications, virtual classrooms, artificial intelligence-driven tutors, and gamified learning environments has revolutionized language education, making it more adaptable to individual needs and learning styles. However, while younger generations quickly adapt to digital innovations, individuals aged 45 and older often face specific challenges in navigating and utilizing these tools effectively. The integration of multimedia systems in foreign language education for this demographic is therefore not only relevant but also a pressing concern for contemporary educational research and practice.

The rising demand for lifelong learning and global communication skills has led to a growing number of adults and middle-aged learners seeking foreign language proficiency for career advancement, cross-cultural interactions, and personal enrichment. Unlike digital-native learners, older individuals often encounter cognitive, psychological, and technological barriers that can hinder their learning progress. These challenges include slower information processing, memory retention difficulties, decreased adaptability to new technologies, and varying degrees of digital literacy. Additionally, motivational factors such as anxiety about using technology, concerns about making errors in online environments, and preferences for face-to-face learning further impact their engagement with multimedia-based education. Thus, developing inclusive, adaptive, and effective multimedia-based foreign language programs tailored to the specific needs of learners aged 45 and older is essential for fostering lifelong education and reducing the digital divide.

Recent research underscores the potential of multimedia systems - including e-learning platforms, intelligent tutoring systems, augmented and virtual reality (AR/VR), speech recognition software, and adaptive learning algorithms – in optimizing foreign language education. These tools offer a range of advantages, such as real-time feedback, interactive simulations, multimodal learning support, and personalized content delivery. Despite these advancements, existing studies predominantly focus on younger learners, leaving a significant gap in understanding how multimedia-based approaches can be effectively adapted to meet the cognitive and motivational needs of older adults. Moreover, the usability and accessibility of these technologies for middle-aged and senior learners require further exploration to ensure that multimedia-supported language learning is truly inclusive.

The analysis of recent research and publications Foreign language learning in later adulthood faces unique cognitive, motivational, and technological obstacles, and digital/multimedia approaches have emerged as promising but not unproblematic tools. Early work emphasized the benefits and constraints of second language instruction for older adults: Esra Eguz (Eguz, 2019) highlighted gains in mental agility and social engagement but warned of slowed processing speed and memory constraints. Over the years, neuroscientific and cognitive studies have refined our understanding of individual variability in older learners. Jonna Nilsson, Rasmus Berggren, Benjamin Garzon, Alexander Lebedev, and Martin Lovden (Nilsson et al., 2021) showed that hippocampal volume and associative memory capacity are significant predictors of vocabulary learning success in older adults, although short-term training did not reliably induce structural brain changes. Nga-Yan Hui, Manson

Cheuk-Man Fong, Matthew Keng-Hang Ma, Jeremy Yin To Chui and Tammy Sheung Ting Law (Fong et al., 2022) further explored anatomical and cognitive markers to forecast who is most likely to succeed in vocabulary acquisition.

Against this cognitive backdrop, the integration of multimedia systems (audio, video, interactive visual materials) in foreign language education has drawn interest as a way to alleviate sensory or memory constraints. Gabriel Barbuleț (Barbuleț, 2023) reviews how multimedia (e.g. synchronized visuals, interactive feedback) may scaffold comprehension, reduce cognitive load, and promote learner autonomy. Meanwhile, Mohammad Jalaluddin (Jalaluddin, 2023) outlines how multimedia tools (such as video, audio, animations) can assist in ESL/EFL instruction by bringing multimodal input into the learning environment. Greek researchers Catherine Kanellopoulou, Minas Pergantis, Nikolaos Konstantinou, Nikolaos Kanellopoulos, and Andreas Giannakoulou (Kanellopoulou et al., 2021) present examples of web-based interactive audiovisual exercises for foreign language web-based learning, revealing increased learner engagement and flexibility.

A broader survey of computer-based programs for older learners (Klimova, 2020) points to the promise of CALL (computer-assisted language learning) in this domain, but also to persistent usability, motivational, and adaptation challenges. In particular, older learners may struggle with interface complexity, lack of tailored pacing, or insufficient scaffolding. The European Commission's lifelong learning strategy underscores the necessity of digital inclusion across all ages, implicitly supporting the notion that multimedia and digital tools should be age-friendly and accessible (European Commission, 2024).

Recent research (2023–2025) continues these trends. Shelby Sharpe and Susan Elwood (Sharpe, Elwood, 2024) examine e-learning design for older adults, suggesting preferences for visual, example-based, incremental instruction, and the importance of intuitive interfaces. Gemma Wilson-Menzfeld, Jessica Raven Gates, Mary Moreland, Helen Raw and Amy Johnson (Wilson-Menzfeld et al., 2023) explore remote digital skills training for older adults, uncovering barriers (e.g. confidence, interface design) and facilitators (personalization, scaffolding) that are relevant to multimedia language systems. Meanwhile, a 2025 study on language learning effects (Brouwer et al., 2025) compared language learning with other cognitively demanding activities and found favorable effects on cognitive function, supporting the value of sustained engagement.

In sum, the literature shows three converging trajectories:

- increasing clarity about the cognitive and neural constraints older adults face in L2 acquisition;
- design efforts to build multimedia language systems that mitigate those constraints (through scaffolding, multimodal support, and adaptive pacing);
- growing attention to usability, inclusion, and motivation in digital systems targeted at older learners.

These trends point toward a research agenda concerned not just with whether multimedia helps in later-life language learning, but how systems must be designed to

align with older adults' cognitive profiles, motivational needs, and digital literacy levels.

Presentation of the main research material. In today's rapidly changing world, the need for lifelong learning has become more evident than ever, particularly in the realm of foreign language acquisition. While it is often assumed that language learning is a pursuit best undertaken in childhood or early adulthood, an increasing number of individuals aged 45 and older are engaging in foreign language studies. Their motivations go beyond mere professional necessity; instead, they encompass a wide range of social, psychological, and personal factors (Klimova, 2020). Among these are the pursuit of postponed aspirations, adaptation to new life circumstances, self-development, and professional reintegration in unfamiliar linguistic environments. Additionally, global crises, such as the ongoing war in Ukraine, have forced many people to relocate and adapt to new societies where language proficiency becomes a fundamental tool for survival and integration. Below, we briefly characterize the most common ideas which can be seen as motives for starting to learn a foreign language at age 45 and older:

- **Fulfilling Deferred Dreams.** Many individuals aged 45 and older embark on foreign language learning as part of what can be described as the "postponed life" syndrome (the pursuit of dreams and ambitions that were set aside due to career, family, or other obligations earlier in life). For many, learning a language is not just about communication but about finally realizing long-held aspirations of travel, cultural exploration, or even academic pursuits. With children grown up and professional responsibilities shifting, many people find themselves with the time and motivation to engage in learning purely for personal fulfilment (Kanellopoulo et al., 2021). Studying a foreign language in this context is an act of self-actualization, allowing individuals to reconnect with their younger selves and explore opportunities that were once inaccessible;

- **Foreign Language Learning as a Hobby and Intellectual Stimulation.** For some, language learning serves as a hobby, an intellectually stimulating activity that offers continuous challenges and rewards. Research indicates that engaging in cognitive activities such as language acquisition can enhance memory, delay cognitive decline, and improve mental agility, making it a valuable pursuit for older learners. Unlike younger individuals who may feel the pressure of exams or career requirements, learners aged 45 and older often enjoy the process itself – engaging with literature, films, history, and cultural traditions in the target language. The satisfaction of learning for its own sake, without the constraints of formal education, makes this an appealing pastime for many (Zilberman, 2019);

- **Professional Reinvention and Adaptation in New Conditions.** Many individuals aged 45 and older find themselves needing to adapt to new professional landscapes where knowledge of a foreign language becomes a crucial asset. For instance, the war in Ukraine has forced millions to relocate to foreign countries, where learning the local language is necessary for employment, social integration, and everyday life. Many professionals who had stable careers in Ukraine now face the challenge of rebuilding their professional identities in countries such as Poland,

Germany, Spain, or Canada. In such cases, foreign language learning is not just an optional skill - it is an essential tool for survival, economic stability, and restoring a sense of agency in an unfamiliar environment. Similarly, globalization and technological advancements have led many professionals to seek alternative job opportunities, many of which require foreign language proficiency. A significant number of middle-aged and older workers are now entering global job markets (Naumciuk, 2023) where English, Spanish, or Chinese are dominant languages. Learning a foreign language, therefore, becomes a means of enhancing employability, increasing competitiveness, and accessing new career opportunities;

- **Social Integration and Community Building.** For many adults, learning a foreign language is also about social connection – building relationships, engaging with new communities, and overcoming isolation. This is particularly true for individuals who have moved abroad and need to communicate effectively in a new society. Learning the local language allows them to participate in social activities, engage with neighbors, and integrate into the cultural fabric of their new home. Beyond forced migration, many older adults choose to retire abroad in countries where they wish to experience a different lifestyle. Spain, Portugal, and Italy, for example, have become popular destinations for retirees from Northern and Eastern Europe. For these individuals, learning the local language is an essential step in feeling truly at home, rather than remaining isolated in expatriate communities. Language learning also fosters intergenerational connections. Grandparents who learn a foreign language may do so to communicate with their grandchildren growing up in multilingual households or to connect with younger generations who are immersed in global cultures. This helps strengthen family bonds and bridges the generational gap;

- **Emotional Well-being and Psychological Benefits.** Beyond practical needs, learning a foreign language provides emotional and psychological benefits for individuals aged 45 and older. Engaging in language learning can boost confidence, enhance self-esteem, and combat feelings of stagnation or irrelevance that some individuals may experience in midlife. It provides a sense of progress, accomplishment, and personal growth, all of which contribute to overall well-being (Zilberman, 2019);

- **Mental Health Prevention.** Language learning at age 45 and older is increasingly recognized by medical professionals as an effective way to prevent cognitive decline and mental diseases such as dementia and Alzheimer's disease. Engaging in foreign language study stimulates neural connections, enhances memory, and improves problem-solving skills, keeping the brain active and resilient. Research supports that multilingual individuals show delayed onset of cognitive disorders compared to monolinguals. Many neurologists and geriatric specialists recommend language learning as part of cognitive training programs, alongside physical exercise and social engagement. Thus, mastering a new language is also seen in the modern world as a scientifically supported method for maintaining brain health (Nilsson et al., 2021);

- **Cultural Self-Identification.** For individuals from emigrant families and ethnic minorities, especially those belonging to small or endangered linguistic communities,

learning a heritage language after the age of 45 is a powerful way to reconnect with their cultural roots. It allows them to rediscover family history, strengthen their sense of identity, and preserve ancestral traditions. Many second- and third-generation emigrants seek to reclaim their linguistic heritage to communicate with older relatives, pass it on to future generations, or engage with their cultural origins more deeply. In an era of globalization, language learning becomes a means of cultural revival, preventing the erosion of minority languages and traditions (European Commission, 2024).

Learning a foreign language after the age of 45 presents unique challenges, both cognitive and psychological, that often hinder progress and lead many learners to discontinue their studies early. These difficulties stem from biological, psychological, social, and technological factors, ultimately causing some learners to discontinue their studies prematurely.

One of the primary difficulties for older learners is the decline in memory retention and processing speed. Unlike younger individuals, who can quickly absorb new vocabulary and grammatical structures, adults aged 45 and older may struggle with recall and fluency. Studies indicate that working memory capacity diminishes with age, making it harder to store and retrieve new linguistic information. Additionally, phonetic adaptability weakens over time, making pronunciation and accent acquisition more difficult. This can lead to frustration, as learners may feel that their progress is slow or that they will never achieve native-like proficiency (Fong et al., 2022).

Many learners in this age group experience psychological barriers, including fear of failure. Unlike younger students, who are accustomed to academic challenges, older individuals may feel embarrassed about making mistakes or speaking with an accent. Fear of judgment, particularly in group settings, can discourage active participation and slow learning progress (Eguz, 2019). This lack of confidence often leads to early abandonment, as learners feel they are not making sufficient progress.

Adults over 45 often have demanding jobs, family obligations, and social responsibilities. Balancing work, childcare, or even caring for elderly parents makes it difficult to maintain consistency in language practice. Irregular study habits hinder retention, making learners feel as though they are “starting over” each time they return to their studies.

Lack of suitable learning methods and technological barriers must be seen as the main factor contributing to the failing multimedia and online education methods for people aged 45 and older (Powers, 2019). The first reason is because older learners may prefer traditional, structured learning approaches rather than self-directed online courses, yet they often struggle to find suitable programs that cater to their needs (Mei, 2022). The second factor is, that most language learning programs cater to younger audiences (age 6-35), relying on fast-paced, technology-driven methods that may not be suitable for older learners. Mobile apps, online platforms, and gamified learning tools often lack age personalization (in terms of speed, context, and computer literacy) and can be overwhelming for individuals who are less comfortable with digital technology (Klimova, 2020), (Steber, Rossi, 2021).

To identify key gaps in multimedia-based language learning for students aged 45 and older, a survey was conducted among language course participants in three countries: Ukraine (Kharkiv), Turkey (Istanbul), and Spain (Cádiz). The study involved 75 learners aged 45 and older, distributed as follows: 30 participants aged 45-55, 30 aged 55-65, and 15 aged 65-75. All participants had prior experience using mobile applications and online platforms for learning French. Over a three-month period, course instructors incorporated the use of these applications and platforms into their training programs, assigning them as independent study and homework tasks.

The survey was conducted in the form of an anonymous questionnaire, focusing on learners' experiences with three widely recommended and highly rated language-learning applications: Duolingo, Babbel, and Memrise. These applications were selected based on their popularity and relevance to the learning needs of students at the beginner level (Pot, 2025). Notably, the survey results did not reveal significant differences in responses based on gender or country of residence. However, clear variations emerged between different age groups, highlighting differences in user experiences, challenges, and learning preferences. Therefore, the survey results contain data for 5 age groups (with the initial assumption of the similarity in the responses among recipients with an age step of 10 years). Table 1 presents the summarized survey results that highlight the shortcomings of each application as a tool for teaching foreign languages to adult learners aged 45 and older.

Table 1

Results of the survey as to using the app as a tool for teaching foreign languages to adult learners aged 45+

	DUOLINGUO	BABEL	MEMRISE
Overall Impression (max 10 points)	6	7	6
Advantages	1) Engaging and motivating gamification. 2) Free version available with many exercises. 3) Reinforces vocabulary through repetition	1) Structured lessons with real-life dialogues. 2) Clear grammar explanations. 3) Lessons build progressively for better retention.	1) Uses spaced repetition for effective vocabulary retention 2) Includes native speaker recordings for pronunciation practice. 3) Provides customizable learning paths for flexibility.

Disadvantages	1) Repetitive exercises can become monotonous. 2) The topics and words are target for younger learners 3) No advanced pronunciation training or feedback.	1) No free version, limiting accessibility. 2) Lacks interactive or AI-driven speaking practice. 3) The topics and context of the dialogues does not reflect the needs and realities of elder students	1) Overemphasis on memorization, lacks holistic language skills. 2) Not suitable for elder people due to its` non-structured approach 3) Limited writing and conversation practice.
Graphic Disadvantages	1) Childish, cartoon-like interface may feel unappealing to older learners. 2) Small fonts and bright colors can cause eye strain. 3) Too much moving and sounding elements	1) Text-heavy layout may feel dull for visual learners. 2) Minimal visual aids for complex grammar explanations. 3) No gamification elements, making it less engaging.	1) Overloaded interface with multiple icons and menus. 2) Inconsistent video and image quality. 3) Too bright, but visually does not reflect the realities of elder people (all the actors are young)
Context Disadvantages	1) Lacks real-world conversational practice. 2) Sentences and conversations feel unnatural and unrealistic for elder learners 3) No clear grammar explanations, making it harder to understand rules.	1) Covers only basic, everyday scenarios, lacks flexibility. 2) Progression is slow for those who prefer fast learning. 3) The context does not cover the topics interesting for elder learners	1) Strong focus on word memorisation but lacks contextual learning. 2) Does not provide structured grammar lessons. 3) Does not cover the needs of elder learners neither in topics, nor in words chosen

As seen from the survey results, none of the analyzed language-learning apps fully meet the needs of adult learners aged 45 and older. Existing platforms often lack structured learning paths, clear grammar explanations, and content relevant to older students, making language acquisition more difficult and less engaging for this demographic (Rudnyeva et al., 2024). To make foreign language apps truly effective for older learners, developers must prioritize content customization, accessibility, and interactive features. Lessons should reflect real-life situations relevant to adult learners, such as workplace communication, cultural adaptation, and professional reintegration. Additionally, apps should offer structured progression with adjustable learning speeds to accommodate different cognitive abilities. Accessibility improvements should include intuitive navigation, larger fonts, and a distraction-free interface to make

learning more comfortable. Furthermore, interactive features must go beyond simple gamification by incorporating AI-driven pronunciation feedback, real-time speaking exercises, and live tutor support (Jalaluddin, 2023), (Barbuleț, 2023). A comprehensive learning ecosystem that blends digital tools with traditional teaching methods will ensure better engagement and retention for lifelong learners. By addressing these gaps, developers can create inclusive, effective, and user-friendly language apps that truly support learners over 45 in their educational journey.

To make language-learning apps more suitable for learners aged 45 and older, developers should consider key modifications that address their specific needs and challenges. Many current platforms focus on younger users, overlooking the cognitive, motivational, and usability factors that influence older learners' success. The modifications should be made in following areas:

1) Content and Context Adaptation. Language apps should include topics and vocabulary relevant to adult learners, such as workplace communication, travel, healthcare, and intergenerational interactions. Lessons should reflect real-world conversations that older learners might engage in, avoiding youth-oriented slang or unrealistic scenarios. Additionally, structured grammar explanations should accompany exercises to support better comprehension.

2) More Structured and Flexible Learning Paths. Unlike younger learners, adults often need clear progression and structured lessons to build confidence. Offering adjustable learning speeds – from intensive to slower-paced formats – would allow learners to customize their experience based on their cognitive preferences and time constraints. Furthermore, reinforcement exercises should emphasize practical usage rather than excessive repetition or isolated memorization.

3) Improved User Interface and Accessibility. Older learners benefit from simplified, clutter-free interfaces with larger fonts, muted colors, and minimal distractions. Excessive animations, numerous sounds, bright designs, and overly complex navigation can hinder engagement. Additionally, ensuring that audio and visual materials reflect diverse age groups would make content more relatable.

4) Enhanced Speaking and Pronunciation Practice. Apps should integrate AI-powered pronunciation feedback and more opportunities for interactive speaking exercises to build confidence in real conversations. Adding optional live speaking sessions with tutors or AI chatbots would also improve communication skills.

5) Affordable and Inclusive Learning. Since many older learners are retirees or career changers, apps should offer affordable plans, free foundational lessons, and discounts for senior users. Reducing ad interruptions in free versions would also improve the overall learning experience.

By making these adjustments, language-learning apps can become more effective, engaging, and accessible for adults aged 45 and older, helping them achieve fluency while enjoying a tailored, supportive learning environment.

Conclusions. The development of multimedia educational tools, including language-learning apps and online platforms, is largely driven by younger developers and marketers who design products based on their own experiences and preferences. However, an increasing number of users are individuals aged 45 and older, who have

distinct cognitive processes, learning expectations, and digital literacy levels. This age gap often results in a disconnect, making many educational tools less effective, engaging, and accessible for older learners. To support lifelong learning, there is a pressing need to develop a high-quality, full-component educational infrastructure that combines both on-site and remote learning opportunities. Multimedia tools play a crucial role in this system, offering flexibility, accessibility, and interactive engagement. However, to be effective, they must be adapted to the realities of adult learners. Many existing platforms lack structured learning paths, clear grammar explanations, and pronunciation support that meet the needs and cognitive realities of older students, focusing instead on fast-paced gamification that may overwhelm older students. Additionally, course content often fails to reflect real-life needs, such as workplace communication, cultural adaptation, and professional development of people aged 45 and older. Multimedia education product developers must collaborate with educators who work with older students and learners over 45 to create customized digital environments that incorporate intuitive interfaces, adaptable learning speeds, and relevant content. A well-structured educational ecosystem that blends multimedia tools with traditional learning methods will ensure that adult learners receive the comprehensive support they need. By prioritizing these improvements, educational platforms can become more inclusive, effective, and valuable, fostering lifelong learning and cognitive engagement for all generations.

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Ірина РУДНЄВА

кандидат педагогічних наук, доцент, доцент
кафедри романо-германської філології,
Харківський національний університет імені
В.Н.Каразіна, Харків, Україна

Yiryna RUDNIEVA

Candidate of Pedagogical Sciences,
Associate Professor, Associate Professor
Department of Romance and Germanic
Philology, V.N. Karazin Kharkiv National
University, Kharkiv, Ukraine

Центр досліджень TRADITAL (переклад,
дидактика і автоматична обробка мов),
факультет літератури, перекладу і комунікації,
Вільний університет Брюсселя, Брюссель,
Бельгія.

TRADITAL Research Center (Translation,
Didactics and Automatic Language
Processing), Faculty of Literature,
Translation and Communication, Free
University of Brussels, Brussels, Belgium.

i.rudneva@ukr.net

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