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Older Adults' Experiences with Mobile-Assisted Language Learning: A Systematic Review of Motivations, Attitudes, and Tensions

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Abstract. This systematic review examines older adultss, University Putra Malaysia, 43400, Selangor, Malaysias, Attitudes, and Tensions肽 ¿n their motivations and attitudes. Following PRISMA guidelines, we searched seven academic databases from inception through December 2023. Seven empirical studies met the inclusion criteria, involving adults aged 60 and above engaging in MALL within non-formal or self-directed contexts. Thematic analysis identified six key themes: (a) high initial motivation, (b) declining motivation over time, (c) intrinsic learning motivations, (d) overall satisfaction, (e) a preference for human interaction and clear guidance, and (f) diverse learner needs. These themes converge into three overarching tensions: initial versus sustained motivation, technological utility versus human connection, and general positivity versus learner heterogeneity. The theoretical frameworks applied in the reviewed studies (Self-Directed Learning, social gerontology, SLA) largely overlooked the specific motivational dynamics of older adults. Although older adults generally demonstrate positive attitudes toward MALL, this synthesis underscores the critical need for personalized and socially enriched learning designs. Given the limited number and heterogeneity of the included studies, these conclusions remain preliminary.

Keywords: older language learner; mobile learning; mobile-assisted language learning (MALL); mobile technologies; lifelong learning

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1. Introduction

Rapid technological advancement and a growing emphasis on lifelong learning have transformed access to education, offering flexible and accessible opportunities tailored to diverse contexts. Lifelong learning is particularly vital for aging populations, as it supports cognitive health, mitigates social isolation, and promotes overall well-being (Dai 2022; Tam 2018; Findsen and Formosa 2012). Among various lifelong learning pursuits, foreign language acquisition has emerged as a highly popular choice, recognized for enhancing cognitive vitality and strengthening the social connections essential for healthy aging (Chen and Shi 2025; Achaa-Amankwaa et al. 2023; Fyndanis et al. 2023). To support language learning among older adults, scholars have increasingly emphasized the potential of mobile-assisted language learning (MALL). By utilizing mobile technologies, MALL offers flexible, on-demand learning experiences, making it an effective pedagogical approach for this demographic (Bali, Tsai-Ching, and Liu 2025; Kukulska-Hulme 2012; Gutiérrez-Colón, Frumuselu, and Curell 2023).

Notably, older adults are progressively integrating mobile devices into their daily routines, benefiting from their portability, accessibility, and capacity to scaffold cognitive functioning by enabling the execution of complex tasks and offsetting age-related cognitive decline (Charness and Boot 2009; Sixsmith et al. 2022; Zhao et al. 2021). This digital adoption has naturally extended to educational spheres, with older adults increasingly utilizing mobile learning tools, particularly MALL applications, for language acquisition (Jin, Kim, and Baumgartner 2019). These applications serve a broad range of purposes, spanning translation utilities (e.g., Google Translate, Youdao) and skill-focused platforms (e.g., Duolingo, HelloTalk), and are widely recognized for delivering engaging, highly motivating learning experiences (Puebla and García 2022).

However, embedding MALL into the daily learning practices of older adults presents distinct challenges. Empirical focus on MALL tailored to older learners remains sparse, despite the technology's potential to offer the flexibility and personalization critical for individuals managing diverse schedules and age-related physical needs (Wang and Christiansen 2019; Ware et al. 2017). Furthermore, effective engagement with MALL requires a baseline of digital literacy that can poses substantial hurdles for this demographic (Vaportzis, Clausen, and Gow 2017). While interactive multimedia features are designed to enhance engagement, they frequently introduce usability barriers for older users (Mitra et al. 2022; Tu et al. 2021).

Similarly, social features intended to foster interaction and cultural exchange can easily overwhelm individuals less accustomed to digital communication platforms (Gelderblom, Dyk, and Biljon 2010; Zhao et al. 2021; Navabi, Fatemeh, and Jannat-Alipoor 2016). It is also crucial to recognize that older learners exhibit immense heterogeneity in their digital competence and educational backgrounds, differing markedly from younger cohorts socialized in digitally saturated environments. This diversity, compounded by age-related physical and psychological changes, heavily shapes how they interact with MALL (Al-Shehab 2020). Compounding these challenges, many MALL tools are primarily designed

with younger users in mind, routinely overlooking the specific needs of older adults, which can exacerbate learning difficulties and inadvertently reinforce ageist stereotypes regarding their technological competence (Chen 2016; Klimova 2023).

While broader scholarship suggests that MALL can boost motivation and positively affect language learning outcomes (Alamer, Al Khateeb, and Jeno 2023; Darsih and Asikin 2020; Fathali and Okada 2017), research investigating its efficacy specifically for older learners remains scarce. This population is highly heterogeneous in terms of digital literacy,, educational attainment, and prior learning experiences, variables that fundamentally dictate how MALL is perceived and utilized(Wang and Christiansen 2019; Puebla, Fievet, Tsopanidi, et al. 2022). Consequently, a granular understanding of their motivations, perceptions, and user challenges is essential to maximize the benefits of MALL and adapt these tools to their unique profiles.

Given these research gaps, a systematic review is warranted to synthesize existing knowledge on older adults' engagement with MALL, particularly in a field where empirical studies remain limited and often fragmented, as noted in prior overviews (Chen 2016; Puebla, Fievet, García, et al. 2022). This review focuses specifically on MALL as a tool for self-directed, non-formal language learning among older adults, deliberately distinguishing it from formally structured curricular interventions. It addresses three core questions: (a) Which theories and methodologies have been employed to examine MALL engagement among adults aged 60 and older? (b) What motivates older adults to engage in MALL? (c) What are their experiences of and attitudes toward MALL?

By addressing these questions, this review makes several contributions to the literature. Theoretically, it consolidates and critically evaluates the disparate frameworks used to study aging, technology adoption, and language learning in MALL contexts. Content-wise, it provides a synthesized evidence base on older learners' motivations and experiences, moving the field beyond isolated studies. Conceptually, it explicitly centers the older learner in MALL research within non-formal contexts, allowing for a more nuanced understanding than standard comparisons with younger "digital native" cohorts afford.

Finally, these findings are intended to inform both educational research and pedagogical practices, supporting the design of MALL environments that better accommodate the nuanced needs of older language learners. The following sections outline the research methods employed in this systematic review, present the key findings, and discuss the theoretical and pedagogical implications, concluding with recommendations for future research on MALL and older adult education.

2. Methods

Systematic reviews follow standardized methodologies to identify, evaluate, and synthesize research evidence, ensuring a rigorous and comprehensive overview of a given topic (Grant and Booth 2009). As illustrated in the PRISMA flow diagram (Figure 1), a comprehensive literature search was conducted across seven

databases: WoS, Wiley, EBSCOhost, Scopus, ProQuest, SAGE, and Taylor & Francis. The search strategy employed the following Boolean keywords combinations: (adults OR older adults OR senior* OR senior citizens OR aging population) AND (language learning OR language acquisition OR second language learning OR foreign language learning OR language education) AND (mobile technolog* OR mobile devices OR smartphones OR tablets OR mobile apps OR m-learning OR mobile-assisted language learning OR mobile language learning). While the formal database search commenced in mid-2023 and concluded at the end of the year, continuous monitoring of emerging literature was maintained throughout the screening process to unsure the inclusion of the most recent evidence..

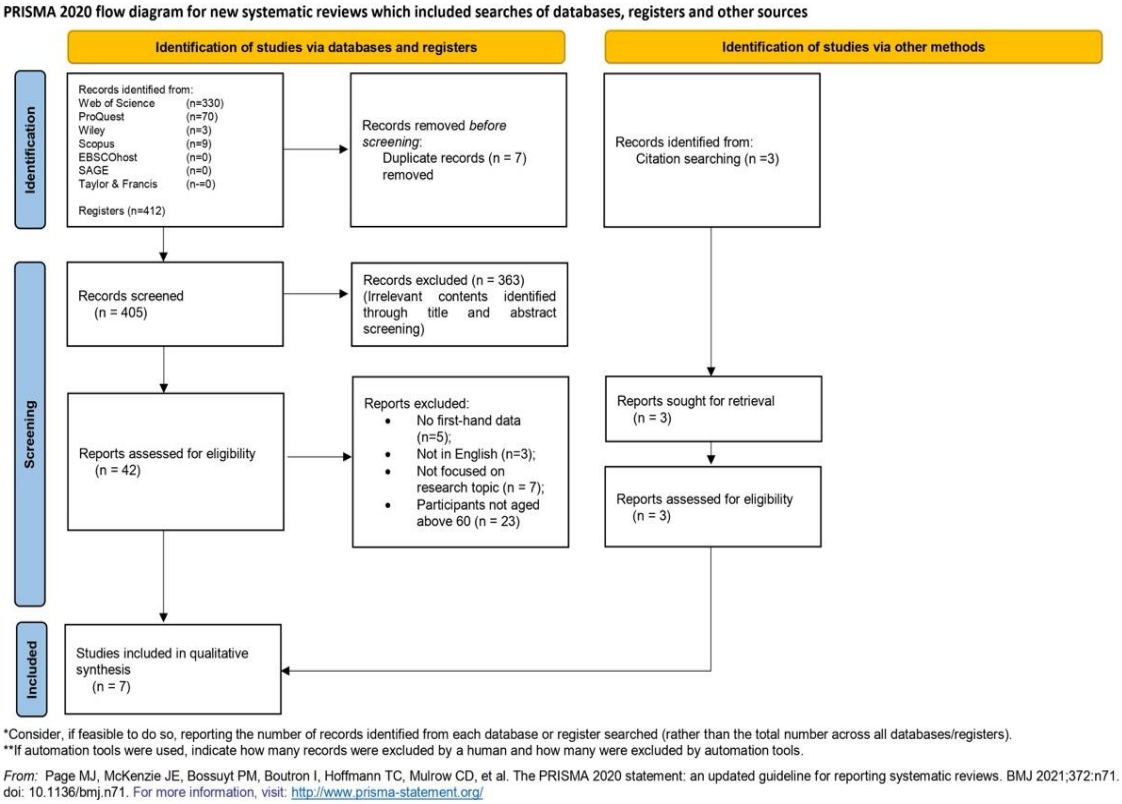

Figure 1: PRISMA flow diagram for the selection procedure

Table 1 outlines detailed selection criteria. Articles were included if they were empirical (qualitative, quantitative, or mixed methods), written in English, published in peer-reviewed journals or as book chapters, and explicitly investigated the experiences or outcomes of adults aged 60 or older utilizing MALL tools. Studies invoving mixed-age cohorts were included only if they provided disaggregated, specific insights into older adults demographic.

Conversely, studies were excluded if they were reviews articles, published in languages other than English, lacked an explicit focus on MALL (e.g., addressing only general digital literacy), or exclusively targeted younger populations. The initial database and register search yielded 412 records: 330 from Web of Science, 70 from ProQuest, 3 from Wiley, 9 from Scopus, and additional records from

relevant registers. A further 3 records were identified through citation searching (scanning the reference lists of relevant articles). Folloeing the removal 7 duplicate records, 405 unique records remained. These were subsequently screened based on title and abstract, resulting in the exclusion of 363 irrelevant records. Forty-two publications from the database and register searches underwent full-text eligibility assessment, after which 38 articles were excluded for reasons detailed in the PRISMA flow diagram: absence of first-hand data (n=5), non-English language (n=3), lack of focus on the core research topic (n=7), and participants not aged 60 or above (n=23). This screening left 4 eligible studies from the database/register search stream. The 3 records identified through citation searching were also retrieved and assessed, all of which met the eligibility criteria for inclusion. Ultimately, a total of 7 studies were included in the final qualitative synthesis. Further details are presented in Figure 1.

Table 1: Criteria for Selecting Eligible Articles

Criteria	Characteristic
Inclusion criteria	**Publication Type:** Full-text English studies published in scientific journals and book chapters **Study Design:** Empirical studies (qualitative, quantitative, or mixed-methods). **Target Population:** Participants aged 60 or older, consistent with the United Nations' general definition of older adults. **Research Focus:** Studies explicitly investigating older adults' experiences with or outcomes of using Mobile-Assisted Language Learning (MALL) tools. **Data Specificity:** Studies involving broader age ranges are included only if they provide specific, disaggregated data or analysis pertaining to the older adult subgroup.
Exclusion criteria	**Article Type**: Review articles (i.e., non-empirical, secondary literature). **Language**: Studies not published in English. **Research Scope**: Studies not specifically focused on Mobile-Assisted Language Learning (MALL). **Target Population:** Studies that do not specifically investigate or report findings on older adults.

The rigorous selection process yielded a final corpus of seven studies, underscoring the nascent and limited nature of empirical research specifically addressing MALL engagement among older adults aged 60 and above. This scarcity, compounded by the reality that only two of the seven studies were explictly designed to explore user experiences (see Table S1), introduces a

potential source of evidence bias. It constrains the depth and diversity of experiential data available for thematic synthesis concerning older adults' perceptions and attitudes, a core objective of this review. Consequently, the findings should be interpreted as an initial, rather than exhaustive, mapping of the field.

Following study selection, an inductive thematic analysis was performed utilizing Braun and Clarke's (2006) framework. Initially, study characteristics such as publication year, researc context, and participant demographics were systematically coded. Subsequently, recurrent patterns related to older adults' motivations, perceptions, and experiences with MALL were identified through inductive reasoning. Explicit and implicit theoretical frameworks were also examined to scrutinize their application to older learners' MALL engagement. To address the theoretical diversity across the included literature, the analysis adopted a dual focus. First, the specific theoretical perspectives underpining each study (e.g., motivation theories, technology acceptance models) were categorized.

Second, during thematic synthesis, we critically examined how these varied theoretical lenses informed the respective research questions, methodological choices, and interpretations of findings. Themes and trends were then synthesized to highlight directions for future research. Figure 1 illustrates the study selection process, and Table S1 provides an overview of the seven included studies, summarizing authors, objectives, methodologies, participants, target languages, and key findings. To ensure rigor and consistency, three authors collaboratively oversaw the search and evaluation precess. One author carried out the database search, screened articles for eligibility, extracted data, and identified preliminary themes. The remaining two authors independently reviewed and refined the coding and thematic analysis to ensure alignment with the review objectives.

To assess the methodological quality of the seven included studies, we employed the Mixed Methods Appraisal Tool (MMAT version 2018). Two authors independently evaluated each study against the appropriate criteria based on its specific design (qualitative, quantitative, or mixed methods), with any disagreements resolved through consensus-seeking discussion. All seven studies met the minimum quality threshold, although sample sizes and the directness of evidence regarding learner experiences varied considerably. Detailed MMAT scores are provided in Supplementary Table S2. This quality appraisal enhances the transparency and rigor of the synthesis, while the heterogeneity of the included studies is explicitly acknowledged as a inherent limitation.

3. Results

3.1 Contextual Analysis of the Reviewed Studies

Although no chronological restrictions were imposed on the lierature search, the final inclusion of only seven studies underscores the sparse and still emerging foundation of this field. This section begins by outlining the key characteristics of these studies in Table 1, followed by a synthesis of their primary theoretical frameworks and the identification of six core themes pertaining to learner motivation and attitudes. Crucially, these seven studies exhibit substantial

heterogeneity across their objectives, methodologies, and participant cohorts. Only two studies, namely Wang and Christiansen (2019) and Puebla, Fievet, Tsopanidi, et al. (2022), focus directly on investigating older learners' firsthand experiences with MALL. In contrast, four other publications (Klimova 2023; Klimova and Sanda 2021; Puebla, Fievet, García, et al. 2022; Ware et al. 2017), were primarily designed to develop or ecaluate MALL applications and programs for older adults, meaning that insights into motivations and attitudes emerged merely as secondary outcomes. The remaining study by Panayiotou et al. (2020) examines the deployment of mobile translation untilities within healthcare contexts; albeit not strictly classified as MALL research, it offers transferrable insights into how older populations perceive and interact with relevant digital technologies.

This literature profile, characterized by a heavy orientation toward system design and a reliance on indirect experiential data, represents a central methodological constraint of the current review when coupled with the generally small sample sizes across the corpus(see Table 2). It demonstrates that the extant evidence base remains insufficient to support a fully nuanced, comprehensive understanding of older adults' MALL trajectories. Consequently, the findings and conclusions articulated herein preliminary and exploratory. Rather than serving as a basis for broad generalizations, their purpose is to map the essential landscape of existing knowledge and establish a robust baseline for more targeted, rigorous future inquiry.

Table 2: Characteristics of Studies Included

Source	Topic	Methodology	Theoretical Perspective
Ware et al. (2017)	language learning app	Qualitative evaluation	Accessibility design
Wang and Christiansen (2019)	MALL apps using	Qualitative study	Sociocultural theory
Klimova and Sanda (2021)	mobile app prototype	Mixed methods	Cognitive training
Panayiotou et al. (2020)	mobile translation apps using	Qualitative study	Technology acceptance
Puebla, Fievet, Tsopanidi, et al. (2022)	commercial MALL app using	Qualitative study	Informal learning
Puebla, Fievet, García, et al. (2022)	language program	Program evaluation	Social connectedness
Klimova (2023)	mobile language learning app	Experimental study	Educational technology evaluation

3.2 Which Theories and Methodologies Have Been Used to Understand Mall Engagement Among Adults Aged 60 and Older?

Most studies (n=5) employed a mixed-methods design, while the remaining two adopted a descriptive quantitative method and a design-thinking approach, respectively. Critically, only three of the seven studies explicitly leveraged established theoretical frameworks to guide their inquiry or interpret their empircal data. This sparse theoretical grounding underscores the nascent and predominantly application-driven nature of scholarship in this domain.

The identified frameworks span Self-Directed Learning (SDL) theory, social and educational gerontology, and Second Language Acquisition (SLA). This low rate of theoretical engagement reflects a field in its infancy , where empirical experimentation frequently precedes conceptual integration. Consequently, the extant findings, while individually insightful, remain conceptually fragmented and isolated from a shared theoretical foundation, thereby hindering meta-synthesis and cumulative knowledge development.

3.3 Self-Directed Learning (SDL) Theory

Self-Directed Learning (SDL) theory (Knowles 1975) prioritizes learner autonomy, whereby individuals independently identify their learning demands, formulate goals, locate resources, and appraise their own progress (Sun et al. 2023; Nasri, Halim, and Abd Talib 2020). By shifting educational paradigm from a teacher-centered model to a self-determined trajectory, SDL has been widely recognized as highly compatible with mobile learning environments (García Botero, Questier, and Zhu 2019; Lai and Zheng 2018; Li, Bonk, and Zhou 2024; Xodabande and Atai 2022; Zhang and Pérez-Paredes 2021).

Within the final corpus, Wang and Christiansen (2019) and Puebla, Fievet, Tsopanidi, et al. (2022) explicitly operationalized SDL theory to scrutinize the behaviors and experiences of older adults engaging with MALL. SDL is particularly suited for MALL research, as evidenced in several studies (García Botero, Questier, and Zhu 2019; Lai and Zheng 2018; Li, Bonk, and Zhou 2024; Xodabande and Atai 2022; Zhang and Pérez-Paredes 2021).

Drawing on this framework, Lai and Zheng (2018) delineated three core self-directed MALL: personality (supporting learners' autonomy to study anytime and anywhere), connectivity (facilitating interaction with peers and target-language native speakers), and authenticity (providing opportunities for contextualized language use). These attributes interface closely with the core tenets of gerontological education identified byCreech and Hallam (2015), which advocate for person-centered learning (enhancing autonomy and cognitive stamina), fellow-centered learning (cultivating social integration), and matter-centered learning (offering existential purpose and cognitive challenge).

Evaluated through this integrated lens, MALL emerges as a potent conduit for enriching the educational experiences of aging populations. When research is anchored in SDL, the analytical focus naturally converges on individual agency, idiosyncratic goal-setting, and the self-regulatory strategies learners deploy to navigate digital tools. Yet, while This paradigm illuminates the empowering

potential of MALL for older adults, it frequently enderplays the structured social scaffolds and communal dimensions inherent to sustainable language learning.

3.4 Social and Educational Gerontology

As reviewed, Puebla, Fievet, García, et al. (2022) developed SprachenTanz, a prototype MALL application for older learners that integrates core tenets of social and educational gerontology. Gerontology, as a multidisciplinary domain, examines the physical, psychological, and social dimensions of aging, whereas social gerontology focuses specifically on older adults' societal roles, kinship dynamics, and community ties. Drawing, the developers of SprachenTanz sought to (i) foster personal connections, (ii) strengthen community bonds, and (iii) promote societal engagement through group activities and peer tutoring, with digital technology acting as a crucial catalyst for enhancing these interpersonal networks and facilitating purposeful social interaction (Moore and Hancock 2020; Zhao et al. 2021).

Complementing this approach, educational gerontology explores the distinct learning imperatives of older adults' (Formosa 2021; Glendenning 1983) and incorporates Knowles' (1984) principles of andragogy, which privilege intrinsic motivation, experience-based learning, and practical, problem contered knowledge. Ware et al. (2017) operationalized similar andragogical principles within a technology-mediated language program, prioritizing social integration and experiential learning trajectories. Their empirical insights demonstrate that older learners interface positively with MALL, reinforces its viability as a robust instrument for effective lifelong learning. Collectively, this gerontological orientation shifts the analytical focus of the literature away from solitary individual autonomy toward social connectivity, community building, and learning as an explicit conduit for social inclusion and existential fulfillment in later life.

3.5 Second Language Acquisition (SLA)

Alongside social and educational gerontology, principles form second language acquisition (SLA) offer crucial affordances for the pedagogical architecture of MALL tailored to older populations. Puebla, Fievet, García, et al. (2022) infused SLA principles into their prototype application by orchestrating blended offline events (e.g., wine tastings) where participants deployed the target language within ecologically valid, real-life contexts, thereby optimizing situational authenticity and affective engagement. This pedagogical design interfaces closely with Krashen's (1981) Input Hypothesis , which mandates consistent exposure to comprehensible input that slightly exceeds the learners' baseline proficiency level.

Similarly, Ware et al. (2017) drew on SLA motivational paradigms, recognizing internal driving factors as indispensable variables forovercoming age-related cognitive hurdles in language acquisition (Dörnyei 2014; Marinova-Todd, Marshall, and Snow 2000). Older adults' explicit desire for authentic social interaction and cognitively active learning (Chen 2022; Puebla, Fievet, García, et al. 2022; Ware et al. 2017) serves as a critical psychological scaffold that sustains their long-term engagement with MALL tools. Ultimately, the confluence of these diverse theoretical trajectories suggests that self-directed MALL holds

considerable promise for older demographic. However, actualizing its full pedagogical efficacy necessitates more rigorous, cross-disciplinary research that synthesizes SLA mechanisms with gerontological frameworks and adult learning theories to optimize learning outcomes. This integrated lens explicitly anchors the design of future MALL tools within established language learning dynamics, ensuring that technological affordances remain carefully calibrated to the empirical realities of input, motivation, and meaningful communicative practice.

The limited adoption of theoretical frameworks, encompassing SDL, social gerontology, and SLA reveals different priorities within the current literature, which focus somewhat discrepancies on learner autonomy, social connectedness, and pedagogical architecture, respectively. Crucially, these paradigms have been applied only sporadically and in relative isolation. This lack of consistent theoretical grounding, compounded by the methodological diversity across the studies, severely impedes cross-study comparisons and frustrates the synthesize of findings into a cohesive body of knowledge. Future research must therefore deliberately adopt and transparently articulate robust theoretical frameworks. Developing integrated models that cross-fertilize insights from adult learning, gerontology, and language acquisition is essential to advance a holistic understanding of MALL for older populations and to fully unlock its pedagogical potential.

3.6 Findings: The Interplay of Motivation and Experience in MALL for Older Adults

A systematic analysis of the seven included studies indicates that older adults' engagement with MALL is characterized not by binary positive or negative orientations, but rather by a series of core conceptual tensions that intricately intertwine learner motivation with lived experience. These tensions illuminate the nuanced and often contradictory role that moblile technologies play in late-life language education. Accordingly, the synthesized findings are organized around three central dialectical tesions that define the older learners' MALL trajectory.

3.7 Tension 1: High Initial Motivation vs. Challenges to Sustained Engagement

Older learners routinely demonstrate a robust initial interest in adopting MALL, propelled by a baseline of digital confidence and a strong intrinsic desire to pursure lifelong language learning (Klimova, 2023; Puebla et al., 2022; Ware et al., 2017). However, this psychological momentum frequently diminishes over time, heavily undermined by persistent technical barriers (e.g., small screens, unclear instructions) alongside a perceived deficit in synchronous, face-to-face interaction (Klimova & Sanda, 2021; Wang & Christiansen, 2019). Notably, because the evidence documenting this motivational decline rests primarily on a single qualitative study (Puebla et al., 2022) and requires cautious interpretation.

3.8 Tension 2: Appreciation for Technological Utility vs. Longing for Human Connection

Older adults consistently report satisfaction with MALL's usefulness for language development social belonging (Panayiotou et al., 2020; Puebla et al., 2022; Ware et al., 2017). Concurrently, they express a strong need for clear guidance and direct

human interaction, suggesting that blended models combining digital tools with social support are most effective (Klimova & Sanda, 2021; Puebla et al., 2022).

3.9 Tension 3: Prevalent Positive Attitudes vs. Significant Individual Heterogeneity

Despite overall positive attitudes, all studies highlight considerable heterogeneity in prior experience, physical abilities, and learning pace. Successful MALL interventions must accommodate this diversity through flexible features such as font size customisation and self-paced learning (Klimova & Sanda, 2021; Ware et al., 2017).

4. Discussion

This review synthesises a small but insightful body of research. Below, we interpret the three core tensions identified in the Results, situate them within broader theoretical contexts, and address critical gaps in the literature.

4.1 Insights of MALL among older language learners

Based on a systematic synthesis of the currently limited and heterogeneous body of literature, this review delineates the contours of what is known and highlights significant unknowns in the research on older adults' engagement with Mobile-Assisted Language Learning (MALL). The analysis shows that their experience is defined not by a uniformly positive or negative stance, but by several core tensions: the tension between high initial motivation and challenges to sustained engagement; the tension between appreciation of technological utility and the desire for human interaction; and the tension between overall positive attitudes and substantial individual heterogeneity.

The review confirms that most older adults demonstrate strong motivation to learn a foreign language later in life and actively use MALL applications to support this goal. This motivation is primarily driven by internal factors, such as the desire to maintain cognitive activity and social connections (Ware et al. 2017; Puebla, Fievet, Tsopanidi, et al. 2022). Their willingness to engage with technology for learning challenges prevailing stereotypes and suggests that they find mobile tools "acceptable and enjoyable" for enriching their lives (Wilson et al. 2022).

A key observation, however, is that initial enthusiasm may not always be sustained. Some evidence suggests that motivation may decline with continued use, partly due to the lack of face-to-face interaction and interpersonal connection within MALL platforms (Puebla, Fievet, Tsopanidi, et al. 2022; Ware et al. 2017). This observation points to the first major tension. Nevertheless, this finding should be interpreted with caution, as it is derived primarily from a single qualitative study and has not yet been replicated in longitudinal or larger-scale investigations. Future research is needed to examine whether, and under what conditions, motivational decline occurs over extended periods. In addition, older learners face practical barriers such as usability challenges (e.g., small screens, unclear instructions) and varying levels of digital literacy, which can further hinder sustained engagement (Klimova and Sanda 2021; Wang and Christiansen 2019).

Despite these challenges, a consistent finding across studies is an overall positive attitude towards MALL. Older learners value its role in fostering social connections and enhancing the learning experience (Puebla, Fievet, García, et al. 2022). The perceived usefulness of these tools in supporting language acquisition and cultural understanding further reinforces this positive outlook (Panayiotou et al. 2020). However, this satisfaction coexists with a strong parallel desire for greater human interaction and clearer instructional guidance within MALL environments, illustrating the second core tension (Puebla, Fievet, Tsopanidi, et al. 2022; Klimova and Sanda 2021).

Finally, the reviewed studies consistently emphasize the significant heterogeneity among older learners. Differences extend beyond prior experience and physical capability to include technological competence, cultural background, and levels of engagement across age subgroups (Klimova and Sanda 2021; Panayiotou et al. 2020). This intrinsic diversity gives rise to the third tension, underscoring that a one-size-fits-all approach is ineffective. Effective MALL design and instruction must therefore adopt a flexible, geragogical perspective that recognizes and accommodates this wide range of needs, preferences, and abilities to create truly inclusive and empowering learning environments.

4.2 Caveats and Future Research Directions

The pedagogical implications outlined above, while informed by the present synthesis, should be interpreted in light of the inherent limitations in the avaliable evidence. This review is based on a small number of studies (n=7) that are methodologically heterogeneous, encompassing design-based evaluations, program assessments, and experiential inquiries with varying sample sizes and contexts.

Consequently, findings related to high motivation, overall satisfaction, and the effectiveness of specific supports (e.g., blended models, clear instructions) should be considered preliminary and context-dependent. The strength of these conclusions is constrained by the limited scope and diversity of the primary research. For example, evidence regarding motivation decline over time relies heavily on a single qualitative study, and the reported positive attitudes reported may be influenced by selection bias toward already engaged learners or the novelty effect in short-term interventions.

4.3 Insights and potential applications

Building on the core tensions identified in this review, between autonomy and sociality, technological utility and learner heterogeneity, and initial motivation versus sustained engagement, this paper proposes an integrated design framework for MALL tailored to older learners. Centred on the principle of socially augmented self-directed learning, the framework outlines targeted strategies. To reconcile sociality with autonomy, it advocates task-driven collaborative features and educator-facilitated interactive structures within self-directed learning.

To address heterogeneity, it proposes dual adaptive systems that combine user-configurable interfaces with algorithmically personalised pathways,

supported by initial technical guidance from educators. To sustain motivation, it recommends embedding core application features for progress visualisation, meaningful feedback, and goal reinforcement, supplemented by policy-driven digital literacy initiatives. This multi-stakeholder approach aims to transform MALL into a flexible, inclusive, and sustainable ecosystem for older language learners.

5. Conclusion

This systematic review synthesises the limited empirical evidence on older adults' motivations, attitudes, and experiences with Mobile-Assisted Language Learning (MALL). Older learners adopt MALL to maintain cognitive vitality, foster social connections, and engage in lifelong learning. However, their engagement is characterized by three core tensions: high initial motivation versus challenges to sustained engagement, appreciation for technological utility versus a persistent desire for human connection, and generally positive attitudes versus pronounced individual heterogeneity.

The originality of this review lies in explicitly centering the older learner in MALL research and proposing the socially augmented self-directed learning framework as a practical response to these tensions. Critically, the evidence base remains nascent: comprising only seven studies, mostly design-oriented, with limited direct exploration of user experiences. Findings regarding motivational decline are preliminary and require confirmation through longitudinal confirmation.

Future research should adopt integrated theoretical models that combine gerontology, second language acquisition, and technology acceptance, and incorporate cross-cultural and longitudinal designs. In practically, MALL tools must beyond one-size-fits-all approaches towards flexible, socially-embedded, and geragogically informed designs. Addressing these gaps will not only improve language learning outcomes but also promote digital inclusion and well-being among older adults in the digital age.

Declaration of interest statement

The authors have no competing interests to declare.

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6. Data availability statement

The authors declare that all the data supporting the conclusions and insights presented in this review are either included in the manuscript or cited appropriately from publicly available sources. No specific datasets were generated or analysed during the writing of this review, as it primarily synthesizes and interprets existing literature and information.

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