

Learner Motivation and Engagement in Generative AI-Assisted Second Language Acquisition: A Narrative Review

Yu Xing *

School of English Studies, Shanghai International Studies University, Shanghai, China

* Corresponding author Email: 2660406743@qq.com

Abstract: This narrative review explores the impact of generative AI on second language acquisition, focusing on learner motivation and engagement, addressing gaps in existing literature by examining both adaptive and maladaptive aspects of motivation and engagement in AI-mediated environments. It investigates how AI tools influence these dimensions across various educational contexts, particularly in comprehensive skills. The review also explores the tensions between adaptive and maladaptive motivation and engagement, highlighting the role of learning strategies in shaping these dynamics. Practical recommendations for educators and future research directions are provided, emphasizing the need for a balanced approach that leverages AI's strengths while mitigating its limitations. The findings suggest that optimizing AI integration in language education requires careful consideration of task design, learner support, teacher intervention, and evaluation systems to foster adaptive engagement and mitigate maladaptive tendencies, ultimately enhancing the language learning experience and promoting learning skills.

Keywords: Artificial Intelligence; Motivation; Engagement; Second Language Acquisition.

1. Introduction

In recent years, second language acquisition has shifted from traditional Computer-Assisted Language Learning (CALL) to generative AI, moving from static, rule-based tools to adaptive, personalized systems—such as chatbots and intelligent tutors—that reshape accessibility, flexibility, motivation, and engagement [1]. This shift is part of a broader, Internet-enabled transformation in educational technology (e.g., social media, mobile learning, LMS) that facilitates cross-border information exchange and fosters critical thinking and problem solving [2]. In language teaching, AI offers innovative responses to individual differences, motivation, and self-regulated learning, with significant implications for pedagogy, assessment, and learner engagement in speaking and writing [3].

Despite growing interest in AI for second language acquisition, existing reviews and studies have notable gaps. Many focused on technical effectiveness and learning outcomes, neglecting broader perspectives essential for understanding AI's multifaceted impact on language learning [1]. There is also a shortfall in research examining learner motivation and engagement in AI-mediated environments [4], with most studies concentrating on monolingual English-speaking contexts and limited attention to multilingual and cross-cultural dimensions. Additionally, there is a tendency to focus on either writing or speaking skills in isolation, rather than considering the integrated nature of language learning. Motivation and engagement have been extensively documented, but demotivation and disengagement have received far less attention, despite its importance for developing comprehensive AI-based language learning interventions. Moreover, the relationships between engagement and disengagement, as well as their interplay with self-regulated learning, remains underexplored.

To address these gaps, this review adopts the Motivation

and Engagement Wheel (MEW) framework as a conceptual lens. The MEW framework integrates the dimensions of positive and negative motivation and engagement, providing a comprehensive structure to examine the impact of AI on second language acquisition (See Fig. 1) [5,6]. By applying the MEW framework, we can systematically analyze how AI tools influence learner engagement and disengagement in speaking and writing contexts and how these interactions relate to self-regulated learning.

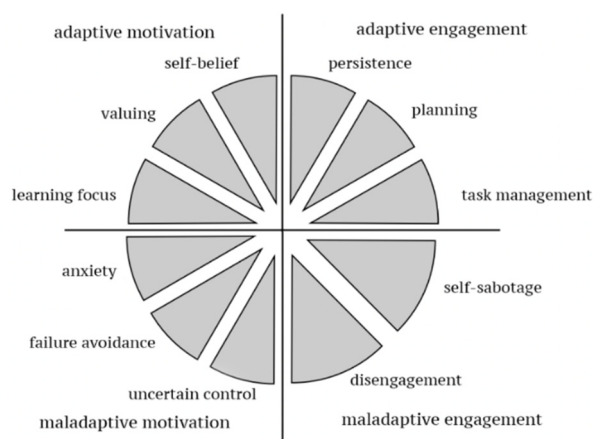


Fig 1. The Motivation and Engagement Wheel (MEW)

To systematically explore the role of AI in second language acquisition, particularly focusing on learner motivation, engagement, and self-regulated learning, the following research questions are proposed:

RQ1: Across the four dimensions of the MEW framework, what patterns of adaptive and maladaptive motivation and engagement emerge in different contexts in language education?

RQ2: How do the tensions and contradictions between adaptive and maladaptive motivation and engagement

manifest within and across the MEW dimensions?

2. Method

Driven by the intention to explore the multifaceted impact of AI on second language acquisition, particularly in the areas of learner motivation and engagement, we purposefully adopted a narrative review approach. This approach involves an initial reading of the literature to gain an overall impression, followed by a more structured process of categorization and reflection, supported by a replicable search and documentation process. This methodological framework ensures that our review is both theoretically rich and methodologically sound.

To systematically organize and classify the literature on the impact of AI on second language acquisition, we developed a multidimensional framework. This framework is designed to capture the complexity of the research landscape and facilitate a comprehensive analysis of the existing studies. The framework includes the following dimensions: Firstly, research participants are considered, including the characteristics of the learners such as their age, language background, and proficiency level, as well as the educational stage at which the study was conducted, ranging from K-12 to university and adult education. Secondly, the context of the study is taken into account, distinguishing between EFL and ESL settings. Thirdly, we examine the skills and tasks targeted by the studies, focusing on comprehensive skills, such as writing and speaking skills and differentiating between authentic, real-world tasks and exam-oriented tasks. Fourthly, the technical aspects are scrutinized, identifying the type of AI tool utilized, such as ChatGPT, Claude, LLM API, or automatic scoring systems, and the nature of the AI intervention, whether it served as an assistant, a substitute, or a co-creator in the learning process. Fifthly, we assess the research methodology, categorizing studies as quantitative, qualitative, or mixed-methods approaches. Sixthly, we focus on motivation and engagement indicators, utilizing the four dimensions of the MEW framework (cognitive, behavioral, affective, and metacognitive) to gauge learner engagement and disengagement. Lastly, we delve into the key findings and tensions, exploring the adaptive (positive) and maladaptive (negative) dimensions of learner motivation and engagement, the impact on learning outcomes, and the role of GenAI. This comprehensive framework allows us to systematically navigate the complex landscape of AI in language education, ensuring that our review is both thorough and insightful.

To ensure the rigor and replicability of our review, we conducted a systematic literature search using the Web of Science database, focusing on the period from 2018 to 2025. This timeframe was chosen to capture the rapid advancements in generative AI technologies and their applications in second language acquisition, particularly following the rise of large language models (LLMs) like ChatGPT. Our search strategy involved using a combination of keywords related to second language education, generative AI, and learner engagement. The search query in Web of Science was structured as follows:

TS=((TESOL OR TESL OR TEFL OR ELT OR ESL OR EFL OR “English as a Second Language” OR “English as a Foreign Language” OR SLA OR “second language acquisition” OR “L2 acquisition” OR “language teach*” OR “language learn*” OR “language pedagog*” OR “language education” OR “foreign language” OR “additional language” OR multilingual* OR bilingual*) AND (“generative AI” OR “generative artificial intelligence” OR “generative pre-trained

transformer” OR “generative pretrained transformer” OR GPT OR “large language model*” OR “neural language model*” OR ChatGPT OR GPT3 OR GPT-3* OR GPT4 OR GPT-4* OR “Google Bard” OR “Claude AI” OR LLaMA OR PaLM OR LLM OR “AI chatbot*” OR “AI writing assistant*” OR “artificial intelligence” OR “machine learning”) AND

(engagement OR motivation OR motivat* OR “student participation” OR “learner participation” OR “classroom engagement” OR “learning engagement” OR “behavioral engagement” OR “emotional engagement” OR “cognitive engagement” OR interest* OR attitude* OR “willingness to communicate” OR WTC))

This search yielded a total of 654 publications. We then screened these publications to remove duplicates and irrelevant studies. The initial screening process involved reviewing the titles and abstracts to ensure that the studies were directly related to the use of AI tools in second language acquisition and focused on learner adaptive and maladaptive motivation and engagement. This process resulted in a preliminary selection of 158 articles. In the next stage, we conducted a full-text review of these 158 articles to ensure they met our inclusion criteria. The inclusion criteria were as follows:

1. The study must focus on the use of AI tools (e.g., ChatGPT, LLMs) in second language acquisition.
2. The study must address learner adaptive and maladaptive motivation and engagement.
3. The study must be published in a peer-reviewed journal or book chapter, and it must be written in English.
4. The study must directly address the use of generative AI in language education.
5. The study must report on motivation, engagement, or related indicators, or such data must be extractable from the text.
6. Reviews, book reviews, editorials, interviews, and commentaries are excluded.
7. Studies with zero citations or those where the full text is not accessible are excluded, although exceptions may be made on a case-by-case basis.
8. Non-English studies are excluded.
9. Studies that focus solely on technical engineering aspects without addressing language learning or teaching are excluded (See Fig. 2).

After screening, 31 articles were selected for detailed data extraction and coding using Excel matrices. These matrices captured information such as source, publication year, country, participants, educational level, skills examined, AI tools, methodology, findings, and mapping to the MEW framework. To ensure reliability and validity, multiple researchers collaborated, undergoing training and regular meetings to resolve discrepancies. Though inter-rater reliability was not statistically measured, consistency was maintained through discussion and consensus.

To systematically analyze the literature and draw meaningful conclusions, we employed a structured synthesis strategy. This strategy involved categorizing the studies based on the four dimensions of the MEW framework: adaptive motivation, adaptive engagement, maladaptive motivation, and maladaptive engagement. Within each category, we conducted a detailed comparative analysis to identify patterns, variations, and tensions. In the synthesis, we interwove findings and discussion, ensuring each section provided a clear and structured analysis. This approach allowed us to highlight key insights, identify gaps in the literature, and

suggest areas for future research. Each section of the synthesis was structured to address specific aspects of the research questions, ensuring clarity and coherence in the presentation of the results. By employing this structured synthesis strategy,

we aimed to provide a comprehensive and nuanced understanding of the impact of AI on learner adaptive and maladaptive motivation and engagement in second language acquisition.

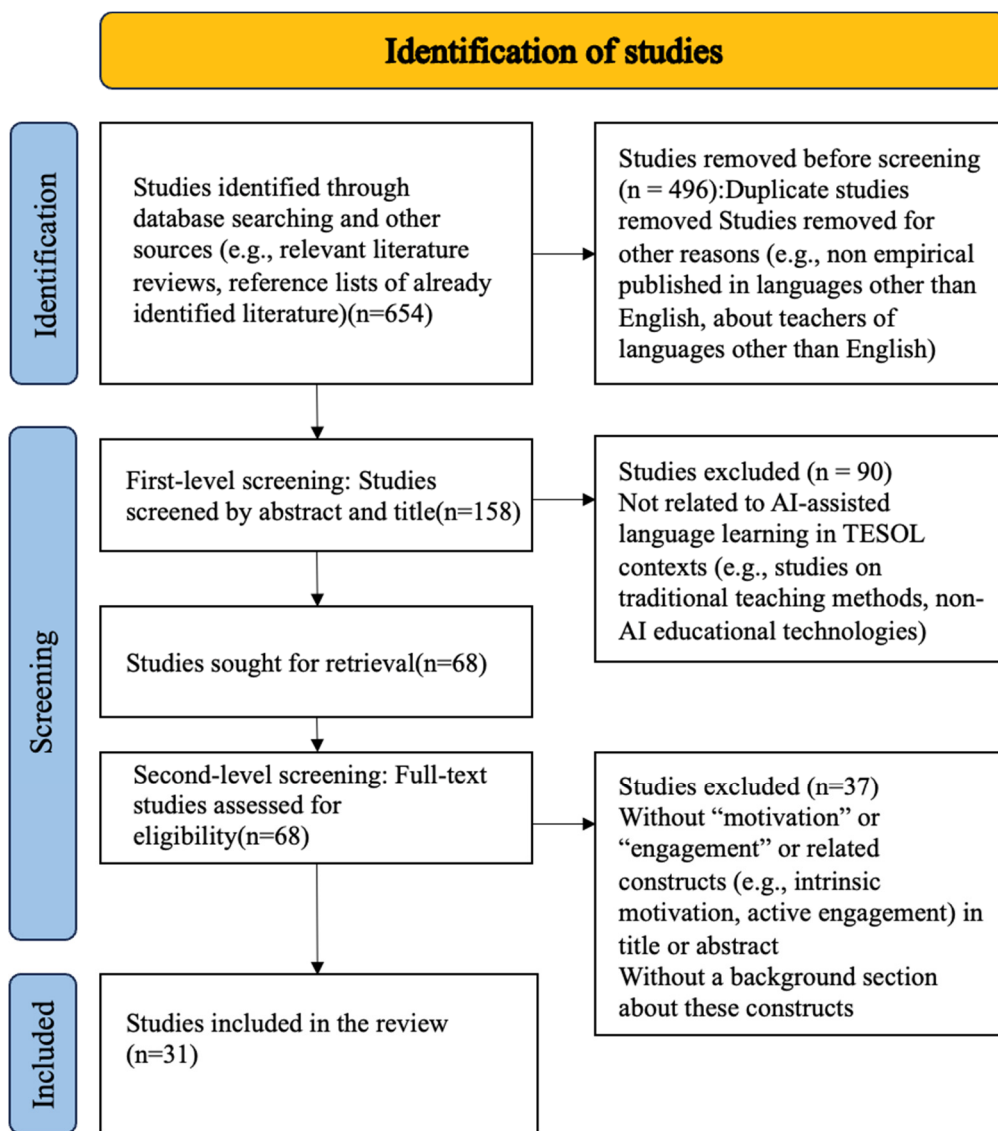


Fig 2. Literature search and selection process

3. Motivation and Engagement in AI-Assisted Second Language Acquisition

This section synthesizes the findings from a comprehensive review of the literature on the impact of AI on second language acquisition, focusing on learner engagement, disengagement, motivation, and demotivation. A total of 158 studies, published between 2018 and 2025, were included in this review. These studies span diverse geographical regions and educational levels (K-12, university, and adult learners), employing a range of methodological approaches (qualitative, quantitative, and mixed methods). The reviewed studies provide a rich tapestry of evidence on how AI tools influence learner motivation, demotivation, engagement, and disengagement in various contexts.

3.1. Adaptive Motivation

Adaptive motivation, within the (MEW) framework, refers to the factors that enhance learners' drive and enthusiasm to engage with AI tools in language learning. This dimension encompasses the sense of purpose, curiosity, and enthusiasm learners exhibit when using AI tools. For example, self-efficacy is a key component of adaptive motivation. As Martin (2007) noted in the context of student motivation and engagement, "Self-efficacy (e.g. 'If I try hard, I believe I can do my schoolwork well') is students' belief and confidence in their ability to understand or to do well in their schoolwork, to meet challenges they face and to perform to the best of their ability." [5] In the context of AI-assisted language learning, learners' self-efficacy regarding AI tools can drive them to actively engage and persist in using these tools. In the literature, adaptive motivation is often operationalized through self-reported surveys and qualitative data from interviews and focus groups.

Recent research has shown that AI tools significantly enhance adaptive motivation in diverse educational contexts. For example, Pikhart et al. (2024) found that university students using AI tools reported higher motivation levels due to real-time feedback and suggestions, which improved their writing planning and revision [3]. Similarly, in academic settings, AI writing assistants have been shown to boost adaptive motivation for Chinese as a Second Language (CSL) students and EFL students. For example, Chen and Gong (2025) and Algaraady and Mahyoob (2023) found that students using AI tools like ChatGPT reported higher motivation levels and improved writing skills [7,8]. These studies have shown that AI tools like ChatGPT can significantly reduce language anxiety and boost confidence among ESL and EFL learners. For instance, the personalized feedback from ChatGPT supports learners' autonomy and competence, enhancing intrinsic motivation and reducing writing anxiety [3,7]. These tools create a low-anxiety environment, allowing students to practice without fear of judgment, which is crucial for overcoming language-related fears [9]. Additionally, structured training in using AI tools can further alleviate anxiety by increasing learners' self-efficacy and their ability to use these tools ethically and effectively [10,11]. This enhanced self-efficacy not only reduces anxiety but also promotes a positive attitude towards AI-assisted learning, leading to more active engagement and improved learning outcomes [12].

The emergence of adaptive motivation in these contexts can be attributed to several factors. The personalized feedback mechanism of AI tools like ChatGPT supports learners' autonomy, competence, and relatedness, which are fundamental components of intrinsic motivation [12]. This feedback mechanism enhances learners' sense of autonomy by providing immediate and relevant feedback, allowing them to take control of their learning process. When learners perceive tasks as achievable and relevant to their goals, their intrinsic motivation is enhanced.

ChatGPT also helps alleviate language anxiety by providing a non-judgmental environment for practice, which encourages students to participate more actively in language activities [13]. This low-anxiety environment is particularly beneficial for ESL learners who often hesitate to participate in speaking practices due to language anxiety. By reducing anxiety and boosting confidence, ChatGPT fosters a positive learning experience, which in turn increases adaptive motivation.

However, there is some heterogeneity in the evidence. While many students find ChatGPT motivating, some learners may still experience frustration if tasks are overly complex or if they struggle with the tool's interface [13]. This suggests that while AI tools can significantly enhance adaptive motivation, the complexity of tasks and the ease of using the tool must be carefully balanced to maintain learner engagement and motivation. Balancing task difficulty and ensuring user-friendly interfaces are crucial for sustaining adaptive motivation in AI-assisted language learning.

3.2. Maladaptive Motivation

Maladaptive motivation in the context of the MEW framework refers to the negative factors that lead to demotivation or reluctance to engage with AI tools in language learning. This includes feelings of frustration, disinterest, and a lack of intrinsic motivation. As Martin (2007) noted, impeding cognitive dimensions such as anxiety, failure

avoidance, and uncertain control can contribute to maladaptive motivation [5]. Anxiety involves nervousness and worrying about schoolwork or exams. Failure avoidance occurs when students work to avoid poor performance or disappointment. Uncertain control reflects students' uncertainty about how to succeed or avoid failure. These factors can manifest as excessive reliance on external control, dependency on AI tools, avoidance behaviors, and surface-level engagement. Maladaptive motivation is often measured through self-reported surveys and quantitative metrics such as task abandonment rates and reduced revision frequency.

These studies have revealed that AI tools, such as ChatGPT, can lead to maladaptive motivation among some language learners. For example, over-reliance on AI tools can undermine learners' autonomy and critical thinking skills, as seen in cases where students depend excessively on ChatGPT for writing tasks, even checking and revising every sentence or word [7]. This dependency can reduce independent effort and hinder the development of essential language skills [14]. Additionally, the lack of emotional support and human interaction when using AI tools can lead to feelings of isolation and reduced motivation, as AI cannot provide the same level of empathy and personalized guidance as human teachers [15]. Furthermore, the limited adaptability and relevance of AI-generated content can frustrate learners, especially when the tools fail to meet individual needs or provide contextually appropriate materials [16]. These issues highlight the need for a balanced approach that combines AI tools with human interaction to foster a more adaptive and effective learning environment.

The emergence of maladaptive motivation in AI-assisted language learning can be attributed to several factors. Evaluation-driven pressure is a significant contributor; when learners feel their performance is overly scrutinized, they may become demotivated. This is particularly evident in high-stakes evaluation systems, which can lead to negative attitudes towards AI tools. Additionally, low digital literacy among learners can cause frustration and demotivation. When learners lack the skills to effectively use AI tools, they may feel overwhelmed and disinterested. The lack of meaningful feedback from AI tools is another critical factor; without supportive and constructive feedback, learners may feel unsupported and demotivated.

These issues can be mitigated through classroom norms and teacher intervention. Teachers can provide additional support and guidance to help learners navigate AI tools effectively. They can also design tasks that encourage deeper engagement with the technology. For instance, teachers can integrate AI with human interaction, addressing the emotional limitations of AI. As noted by Kohnke and Moorhouse (2025), while AI can enhance emotional engagement, it sometimes misses the emotional understanding that teachers can provide [15]. Teachers can sense if a student is having a bad day and adjust their approach accordingly, something AI cannot do. Therefore, balancing AI with human interaction is essential for maintaining a supportive and motivating learning environment. By addressing these factors, teachers can foster a more positive and engaging learning experience for students.

3.3. Adaptive Engagement

Adaptive engagement is the active and effective use of AI tools in language learning. It is characterized by behaviors such as sustained participation, deep learning strategies, and active interaction with AI tools. According to Martin (2007),

adaptive engagement includes dimensions like persistence, planning, and study management [5]. Persistence is the effort students make to understand difficult problems. Planning involves organizing schoolwork and tracking progress. Study management refers to how students use study time and arrange study spaces. These behaviors are measured through classroom participation rates, task completion quality, and observation checklists assessing active involvement. This comprehensive approach provides insights into how learners effectively engage with AI tools in educational settings.

These studies have shown that AI tools, such as ChatGPT, can significantly enhance adaptive engagement among language learners. For instance, the quick access to information, feedback and error correction, language practice, and interactive capabilities of ChatGPT have been found to boost learners' behavioral engagement in lessons [17]. Learners also reported increased emotional engagement and motivation due to personalized feedback and interactive learning experiences provided by AI tools [12]. Moreover, AI-empowered applications have been shown to reduce procrastination and improve cognitive, behavioral, and affective engagement in academic tasks [18]. Additionally, AI-driven training has been found to enhance ESL learners' speaking abilities and self-regulation by providing tailored learning experiences and creating a relaxed environment for interaction [9]. These findings highlight the potential of AI tools to foster a more engaging and effective learning environment when used in conjunction with human-centered approaches.

The promotion of adaptive engagement through AI tools can be attributed to several mechanisms. Scaffolding provided by AI tools, such as real-time feedback and interactive prompts, helps learners manage complex tasks more effectively. Deep et al. (2025) suggests that AI tools can reduce learner anxiety by providing immediate and relevant feedback, which enhances their confidence and engagement [12]. Personalized learning paths offered by AI tools ensure that learners receive content tailored to their individual needs and abilities, increasing the relevance and accessibility of the learning material. Additionally, AI tools can provide a greater amount of comprehensible input, which is crucial for language acquisition. These mechanisms work together to create a supportive and engaging learning environment that encourages deep learning strategies and sustained participation.

3.4. Maladaptive Engagement

Maladaptive engagement refers to the superficial and ineffective use of AI tools in language learning. It is characterized by behaviors such as frequent but shallow participation, surface-level engagement, and strategic coping mechanisms. As Martin (2007) noted, maladaptive behavioral dimensions include self-handicapping and disengagement [5]. Self-handicapping occurs when students create obstacles to their success, like procrastinating or wasting time. Disengagement is when students feel like giving up, accept failure, and exhibit helpless behaviors. Learners may interact frequently with AI tools but provide superficial answers and show minimal reflection. Maladaptive engagement is often measured through indicators such as high task completion rates with low quality, surface-level responses, and low levels of reflective activity.

These studies have shown that AI tools, such as ChatGPT, can significantly enhance maladaptive engagement among

language learners. For instance, the instant solutions provided by ChatGPT for language-related tasks, such as grammar checking and translation, have been found to foster a sense of laziness and reduce critical thinking among learners [4]. Learners also reported decreased motivation to engage in more challenging language-learning activities due to overreliance on AI tools for quick fixes [17]. Moreover, the excessive reliance on AI tools has been shown to hinder the development of critical thinking and creativity, as it restricts opportunities for independent problem-solving and analysis [19]. Additionally, the convenience of ChatGPT can lead to behavioral disengagement, with students relying on the tool to complete tasks without active participation or contemplation [17]. These findings highlight the potential of AI tools to create a less engaging and less effective learning environment when not balanced with human interaction and critical thinking.

The emergence of maladaptive engagement can be attributed to several factors. High tool substitutability, where AI tools can easily replace human effort, leads to learners relying on the AI without engaging deeply. Firstly, reward-oriented evaluation systems can exacerbate this issue, as learners focus on meeting requirements rather than on learning. Additionally, the lack of process-oriented feedback can leave learners without the necessary guidance to engage deeply. To address these issues, classroom norms and formative feedback can encourage deeper engagement. Teacher intervention, such as providing scaffolding and encouraging reflection, can also help learners move from maladaptive to adaptive engagement.

4. Discussion

The findings from this comprehensive review highlight the dual nature of AI integration in second language acquisition, revealing both adaptive and maladaptive engagement patterns across the four dimensions of the MEW framework. Adaptive motivation and engagement were fostered through personalized feedback, real-time suggestions, and reduced anxiety, as evidenced by studies such as those by Pikhart et al. (2024) and Deep et al. (2025) [3,12]. However, maladaptive motivation and engagement emerged due to high tool substitutability, reward-oriented evaluations, and lack of process-oriented feedback, as noted by Parviz (2024) and Mese et al. (2025) [17,19]. The interplay between these factors underscores the importance of balancing task complexity, learner support, teacher intervention, and evaluation systems to optimize AI's role in language learning. Overall, the effective integration of AI in language education requires a nuanced approach that leverages its strengths while mitigating its limitations.

The tension between adaptive and maladaptive engagement in AI-assisted language learning can be understood through the lens of self-regulated learning theory. Self-regulated learning (SRL) theory offers a comprehensive framework for understanding how learners can effectively engage with AI tools in language learning. According to Zimmerman (1990), SRL involves actively managing one's learning processes through setting clear goals, using effective strategies, and continuously monitoring and reflecting on progress [20]. This framework is highly relevant in AI-assisted language learning, where learners have access to immediate feedback and personalized learning paths that can significantly enhance their experience. AI tools can enhance adaptive engagement by providing immediate feedback and

personalized learning paths, which support learners in setting clear goals, monitoring their progress, and adjusting their strategies [20,21]. However, the high substitutability of AI tools can lead to maladaptive engagement when learners rely excessively on AI for quick solutions, bypassing critical thinking and deeper learning. This tension is particularly evident in the forethought phase, where learners may set unrealistic goals if they perceive AI tools as a quick fix rather than a learning aid. In the performance phase, learners may become overly dependent on AI feedback without engaging in self-monitoring and regulation, leading to a lack of critical thinking and deeper learning. In the self-reflection phase, learners may fail to reflect on their learning process if they are not provided with process-oriented feedback, leading to surface-level participation. By integrating the insights from Zimmerman (1990), Zhang (2024)'s theory and research on the effects of self-regulation strategies on EFL learners, educators can better understand the mechanisms of adaptive and maladaptive engagement in AI-assisted language learning [21]. This understanding can inform the design of effective instructional strategies that promote adaptive engagement and mitigate maladaptive tendencies, ultimately enhancing the language learning experience for all students.

To optimize the use of AI in language education, several practical recommendations can be made for teachers and curriculum designers: 1. Task Design: As suggested by Tseng and Lin (2024), designing tasks that require critical thinking and creativity is essential [22]. Instead of relying solely on AI for quick solutions, incorporating open-ended questions and complex problem-solving activities can encourage students to think beyond AI-generated content. This approach helps prevent overreliance on technology and fosters deeper engagement. 2. Evaluation Alignment: Align evaluation systems with the learning process rather than focusing solely on outcomes. Formative assessments that provide detailed, constructive feedback can help students understand their progress and areas for improvement, rather than just meeting requirements. 3. Teacher Training: Offer professional development for teachers to effectively integrate AI tools, focusing on recognizing and addressing maladaptive engagement [19]. Training should ensure AI complements traditional methods, fosters critical thinking, and balances AI use with human interaction and ethical considerations. 4. Classroom Norms: Establish clear norms for the use of AI tools, emphasizing their role as a supplement to, rather than a replacement for, human interaction and critical thinking. Encourage a classroom culture that values effort and deep learning over quick results. These strategies can help create a balanced learning environment that leverages the strengths of AI while addressing its limitations. However, potential side effects, such as increased dependency on technology, should be monitored and managed through ongoing teacher intervention and student support.

The findings of this review highlight several gaps in the current literature, suggesting areas for future research. Firstly, there is a need for longitudinal studies to understand the long-term effects of AI integration on language learning outcomes. Secondly, more research is needed in low-resource contexts to explore the feasibility and effectiveness of AI tools in diverse educational settings. Thirdly, micro-observational studies in classrooms can provide deeper insights into how AI tools are used in practice and their impact on student engagement. Additionally, learning analytics can be employed to track student interactions with AI tools over time,

offering quantitative data on engagement patterns. Finally, mixed-methods approaches that combine qualitative and quantitative data can provide a more comprehensive understanding of the interplay between adaptive and maladaptive engagement. Future research should aim to address these gaps through rigorous, context-specific studies that inform evidence-based practices in AI-assisted language education.

5. Conclusion and Implications

In this narrative review, we have endeavored to analyze the impact of AI on second language acquisition through the lens of the MEW framework, focusing on adaptive and maladaptive motivation, engagement, and disengagement. While AI technologies offer significant potential to enhance adaptive motivation and engagement through personalized feedback, real-time suggestions, and reduced anxiety, they also pose risks of maladaptive motivation and engagement due to high substitutability, reward-oriented evaluations, and lack of process-oriented feedback. The findings underscore the importance of balancing task complexity, learner support, teacher intervention, and evaluation systems to optimize AI's role in language learning. By integrating insights from self-regulated learning theory and empirical studies, educators can design instructional strategies that promote adaptive engagement and mitigate maladaptive tendencies, ultimately enhancing the language learning experience for all students.

The findings from this review have significant implications for both future research and educational practice in AI-assisted language learning. For educational practitioners, the review suggests several practical recommendations. By addressing these implications, educators and researchers can work together to create a balanced and effective learning environment that leverages the strengths of AI while mitigating its limitations. This approach not only enhances the language learning experience for all students but also fosters the development of self-regulated learning skills, which are essential for lifelong learning. For researchers, the review highlights the need for longitudinal studies to understand the long-term effects of AI integration on language learning outcomes. Additionally, more research is needed in low-resource contexts to explore the feasibility and effectiveness of AI tools in diverse educational settings. Micro-observational studies in classrooms and the use of learning analytics can provide deeper insights into how AI tools are used in practice and their impact on student engagement. Mixed-methods approaches that combine qualitative and quantitative data can offer a more comprehensive understanding of the interplay between adaptive and maladaptive engagement.

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