

Unpacking Second Language Motivation in AI-Mediated Contexts: A Scoping Review

Zihang Guo,¹ Chili Li^{1*}¹School of Foreign Languages, Hubei University of Technology, Wuhan, Hubei, China,*Corresponding Author: lichili@hbute.edu.cn

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Abstract: Amidst the rapid evolution and proliferation of artificial intelligence (AI) technologies, the convergence of AI with second language acquisition (SLA) is becoming increasingly salient and pervasive. To assess the existing research on second language (L2) motivation in AI contexts and determine implications for future research, the present study aims to present a scoping review of research on AI-mediated L2 motivation. Specifically, this study aims to explore the frequently adopted theoretical frameworks, the motivational effects of AI on various specific domains of EFL and the factors that may influence the effects of AI-integrated L2 motivation. Totally, 26 relevant peer-reviewed articles (2020-2025) were selected based on Web of Science (WoS) for further analysis, using the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocol (PRISMA-P). The results show that a) five major theoretical frameworks are primarily applied in L2 motivation in AI-mediated contexts, among which the self-determination theory (SDT) is the most frequently used; b) AI plays the facilitative and motivational role in varieties of language learning domains of L2, such as writing, speaking, vocabulary acquisition, grammar and translation; and c) three key factors influencing L2 motivation in AI-mediated learning are technical, psychological, and individual differences. Drawing upon these research findings, this review proposes prospective directions for the future exploration and practical application of AI in the realm of EFL (English as a Foreign Language) learning and teaching.

Abstrak: Di tengah perkembangan pesat dan penyebaran luas teknologi kecerdasan buatan (AI), konvergensi antara AI dengan pemerolehan bahasa kedua (second language learning/SLA) semakin menonjol dan meluas. Untuk mengevaluasi penelitian yang ada mengenai motivasi bahasa kedua (L2) dalam konteks AI dan menentukan implikasinya bagi penelitian di masa depan, penelitian ini bertujuan untuk menyajikan tinjauan cakupan (scoping review) terhadap penelitian mengenai motivasi L2 yang dimediasi oleh AI. Secara khusus, penelitian ini bertujuan untuk mengeksplorasi kerangka teoritis yang sering digunakan, efek motivasional AI pada berbagai domain spesifik pembelajaran bahasa Inggris sebagai bahasa asing (EFL), serta faktor-faktor yang mungkin memengaruhi efek motivasi L2 yang terintegrasi dengan AI. Secara keseluruhan, 26 artikel yang relevan dan telah melalui tinjauan sejawat (2020-2025) dipilih berdasarkan Web of Science (WoS) untuk analisis lebih lanjut, dengan menggunakan Protokol Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA-P). Hasil penelitian menunjukkan bahwa a) lima kerangka teori utama diterapkan secara luas dalam motivasi L2 pada konteks yang dimediasi AI, di antaranya teori determinasi diri (SDT) merupakan yang paling sering digunakan; b) AI memainkan peran fasilitatif dan motivasional dalam berbagai domain pembelajaran bahasa kedua (L2), seperti menulis, berbicara, penguasaan kosakata, tata bahasa, dan penerjemahan; dan c) tiga faktor utama yang memengaruhi motivasi L2 dalam pembelajaran yang dimediasi AI adalah faktor teknis, psikologis, dan perbedaan individu. Berdasarkan temuan penelitian ini, tinjauan ini mengusulkan arah prospektif untuk eksplorasi dan penerapan di masa depan.

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1. INTRODUCTION

Against the backdrop of rapid advancements in artificial intelligence (AI), language education is undergoing a paradigmatic shift of unprecedented magnitude (Yang et al., 2025). The deep integration of AI technologies into the fabric of language learning is fundamentally transforming traditional models of second language acquisition (SLA) (Seddik, 2025).

Specifically, these AI-driven functions whether tailoring content to individual needs, adjusting feedback in real time, or responding to learners' emotional states essentially target the psychological underpinnings of motivation (Dou & Sun, 2025). Their aim is to render second language (L2) learning more congruent with learners' internal desires, sense of competence, and feelings of support. To systematically elucidate how these technical features are translated into enhanced motivation, Self-Determination Theory (SDT) offers a particularly salient theoretical lens. It is one of the most empirically supported theories in language-learning research (Alamer, 2021). In the context of AI-driven educational environments, to foster learners' autonomous motivation has emerged as a critical concern (Ryan & Deci, 2020).

Drawing upon Self-Determination Theory (SDT), a growing body of research has examined the impact of AI technologies on L2 motivation (Annamalai et al., 2023; Jeon, 2022). Empirical findings suggest that language learning apps should nurture key psychological factors (such as autonomy and competence) by offering learners the ability to choose tasks that align with their personal needs or by providing appropriately challenging activities. Specifically, digital applications have been shown to support autonomous L2 learning by enabling students to make choices and direct their own learning paths (Annamalai et al., 2023). In addition to promoting autonomy, AI technologies also hold the potential to enhance learners' sense of competence, particularly when tasks are appropriately calibrated to align with their existing ability levels (Refat et al., 2020). In this way, these apps can effectively enhance learners' intrinsic motivation to engage with AI technologies for language acquisition (Refat et al., 2020).

L2 motivation has been widely recognized as a central determinant of learning success (Wei, 2022), prompting researchers to examine how AI technologies impact motivational processes in distinct linguistic domains. For instance, mobile-assisted learning applications have been found to foster learners' autonomy by offering personalized task selection and self-directed learning trajectories (Annamalai et al., 2023). In parallel, AI tools such as spaced repetition algorithms for vocabulary acquisition and speech recognition technologies for pronunciation enhancement have demonstrated considerable motivational effects by providing tangible progress markers. Nonetheless, the extent to which these motivational benefits manifest appears to vary across language skill areas, suggesting the need for more nuanced, domain-specific investigations (McCrocklin, 2016; Tabibian et al., 2019).

However, this potential benefit must be weighed against possible drawbacks: excessive guidance or over-automated feedback mechanisms may inadvertently diminish learners' decision-making agency, thereby weakening their intrinsic motivation (Xiao et

al., 2024). Such finding underscore that inherent limitations of AI tools may constrain L2 motivational processes, further highlighting the importance of balancing support and autonomy within AI-enhanced instruction. Nevertheless, It is also likely that other contextual or psychological factors in AI-assisted environments contribute to the stimulation or inhibition of L2 motivation. The inconsistencies observed in previous studies regarding how AI tools influence L2 motivation highlight the need for further investigation.

Striving to create sustainable AI learning scenarios, this review study aims to examine the frequently adopted theoretical frameworks in L2 Motivation in AI-mediated contexts, the L2 motivational effects of AI in various dimensions of English learning as well as the factors that may influence the L2 motivational effects of distinct English learning dimensions. It is expected to provide references for researchers and practitioners to explore effective ways of integrating AI in foreign language pedagogy and learning in the future.

To the best of our knowledge, four reviews regarding L2 motivation in AI contexts are currently available (i.e., AlTwijri & Alghizzi, 2024; Bahari, 2023; Jiang, 2022; Yu et al., 2024). For instance, a systematic review has examined the effectiveness of integrating AI technologies to enhance EFL learners' motivation, alongside the factors that influence L2 motivation (AlTwijri & Alghizzi, 2024). A notable limitation of this review, however, is that the PRISMA Flowchart was not used to clearly show the whole process of literature selection. Another review systematically analyzed the theoretical framework and factors influencing L2 motivation in AI contexts, yet it lacked specificity regarding how AI technologies concretely exert motivational effects on learners (Bahari, 2023).

The third review primarily contributed to analyzing computational thinking (CT) applications in language learning across educational contexts, intervention tools, CT skills, language acquisition, and assessment methods (Yu et al, 2024). The final review mainly reviewed research on six dominant forms of AI application (Jiang, 2022). Both two above studies do not offer a complete picture of AI-mediated L2 motivation research, but are merely one-sided reviewed. The aforementioned studies diverge from the present study, which concentrates on other critical aspects of sustaining L2 education as shown in Table 1.

Table 1. The comparison between previous studies and this study

N.	Study	Quality Assessment	Theoretical Frameworks	Effects of AI	Factors influencing L2 motivation in AI contexts
1	2022	×	×	√	×
2	2023	×	√	×	√
3	2024	×	×	×	×
4	2024	×	×	√	√
5	This Study	√	√	√	√

2. LITERATURE REVIEW

Compared to an increasing number of studies on L2 motivation in AI educational contexts, attempts to synthesize the related studies are limited. Among the few reviews, some neglected the theoretical frameworks frequently adopted in AI-assisted language learning for L2 motivation research (AlTwijri & Alghizzi, 2024); others examined research on AI in the EFL context, but did not entirely elaborate on L2 motivation in AI educational contexts, which was merely considered one of sides (Jiang, 2022; Yu et al., 2024). Moreover, neither of them focused on the theoretical frameworks usually used in AI-mediated settings for L2 motivation research (Jiang, 2022; Yu et al., 2024). Thus, the authors proposed the following research question:

RQ1. What are the frequently used theoretical frameworks adopted in research exploring L2 motivation in AI educational contexts?

It has been substantiated that the integration of AI tools can significantly influence L2 motivation (Javaid et al., 2024). Research has primarily explored the L2 motivational effects of AI technologies through various EFL learning tasks, such as writing (Barrot, 2023), vocabulary (Chen et al., 2020), pronunciation (Shafiee Rad & Roohani, 2024) and reading (Shafiee Rad, 2025).

Nonetheless, considering the influence of individual differences, technology acceptance, as well as learning environment, etc., existing research has shown that AI has not produced the expected learning promotion effect in some areas of English learning, and may even lead to a decline in L2 motivation (Basha, 2024; Jammeli et al., 2024). Meanwhile, none of the four existing reviews has systematically reviewed whether AI can promote learning in various specific fields of foreign language acquisition. The facilitative impact of generative AI technologies on L2 learning and teaching has also been verified in AlTwijri and Alghizzi's (2024) reviewed study, but varieties of specific field of EFL has not been systematically analyzed. Hence, whether AI can promote learning in specific learning dimensions of EFL, and then affect L2 motivation, must be systematically studied. Therefore, the following research questions were put forward: RQ2: What role do AI technologies play in L2 motivation of varied specific learning dimensions of EFL?

Generative AI-enabled learning for EFL learners might not be appropriate to all learners (Wei, 2022). Existing research has explored factors that may contribute to the motivational effects of AI on the success of L2, including the individual learner factors (Yuan & Liu, 2025; Yan et al., 2024), technical factors (Xu & Liu, 2025; Yuan & Liu, 2025), affective factors (Xiao et al., 2025).

However, some studies did not systemically review the factors that may lead to the motivational effects of AI on the success of L2 (AlTwijri & Alghizzi; Jiang, 2022). Additionally, the existing review studies are one-sided on the factors that affect the specific language dimensions of SLA research (Bahari, 2023; Yu et al., 2024). These gaps that warrants further exploration of the factors generating the motivational effects of AI on the achievement of L2. This review thus investigates the final research question: RQ3: Which are the factors that may result in the motivational effects of the second language in AI-mediated settings?

3. METHOD

This systematic review was conducted using the PRISMA (Preferred Reporting Items for Systematic reviews and Meta Analyses) method. We follow the PRISMA statement guidelines to complete our review (Moher et al., 2015).

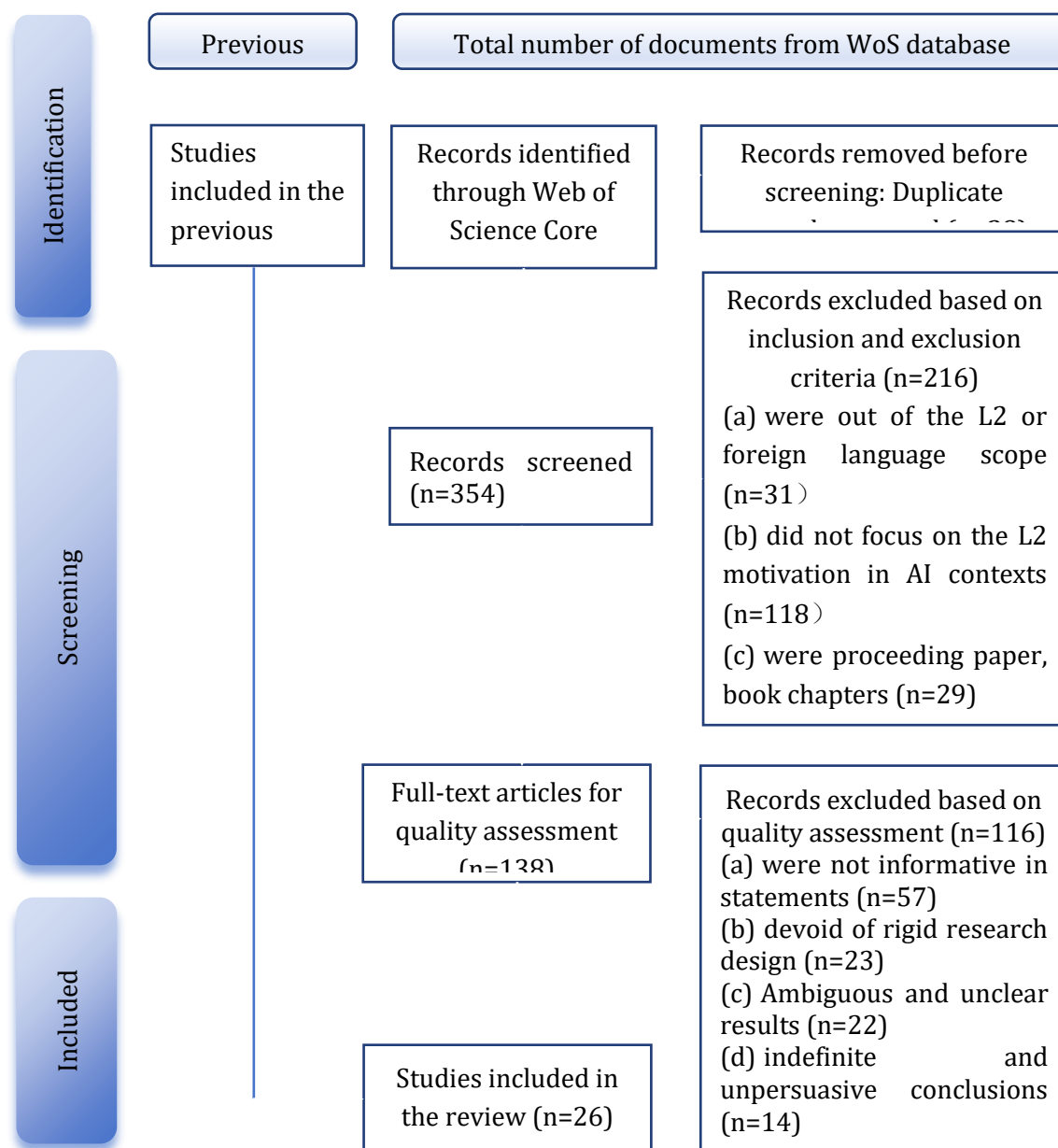


Figure 1. A PRISMA flow diagram of literature selection

3.1 Literature Search

As Figure 1 illustrates, we initiated the process by conducting a literature search of the Web of Science (WoS) Core Collection database. This digital database was selected primarily because WoS ensures the inclusion of the most significant journals (Bartolacci et al., 2020). Date range is the last five years.

3.2 Eligibility Criteria

Our article selection process adheres to specific criteria, which we have conveniently summarized in Table 2. Only the articles that met the following selection criteria for inclusion/exclusion were included to ensure the eligibility criteria as a fundamental prerequisite for the systematic reviews as shown in Table 2.

Table 2. Article Selection Criteria

No.	Criteria	Including	Excluding
1.	Type of database	Web of Science (WoS) Core Collection	-
2.	Papers type	Review article, empirical research	Proceeding paper, book chapters
3.	Language	English	-
4.	Date range	2020-2025	-
5.	Scope	Only articles with AI-Mediated Second Language learning for Motivation are considered.	1. Only involving one topic related to AI but no second language motivation 2. Only involving one topic related to second language motivation without AI. 3. Focusing on the combination between AI and its synonyms and second language acquisition or learning but neglecting the motivation 4. Being proceeding paper, book chapters; 5. Not written in English 6. Having irrelevant title/abstracts/research questions
6.	Search strings	The keywords chosen are associated with the notion of artificial intelligence and its synonyms ("AI" OR "Chat GPT" OR "Generative AI" or "AI technologies") AND the definition of second language motivation and its synonyms ("L2 motivation" OR "foreign language motivation")	1. Only L1 learning 2. Second language acquisition or learning

3.3 Quality assessment

To ensure the quality and reliability of the finalized studies, a quality assessment was carried out based on the University of West England Framework. Based on these measurements, Articles that did not provide informative statements (n = 57), lacked rigid research design (n = 23), had ambiguous results (n = 22), or had unconvincing conclusions (n = 14) were removed according to the quality assessment criteria. Finally,

26 articles were obtained for this review, including 22 empirical articles and 4 review articles.

4. FINDING AND DISCUSSION

4.1. RQ1: What are the frequently used theoretical frameworks/perspectives adopted in AI-assisted language learning for L2 motivation research?

Our second research question was concerned with the theoretical and analytical frameworks being applied in the sample. 20 studies were supported by theoretical frameworks, as shown in Table 3. The results showed that ‘Self-Determination Theory (SDT)’ is the most common theory of L2 motivation in AI contexts. Moreover some studies incorporated the Technology Acceptance Model (TAM) into SDT (Ren, 2025; Zheng et al., 2024). Of the total output in our dataset, 30% (N = 8) of the work drew centrally on Ryan and Deci’s (2017) SDT, followed by L2 Motivational Self System (L2MSS) (N = 4), Vygotsky’s Social Constructivism (N = 4), and Self-Regulated Learning Theory (N = 4). The least common were the publications involving social cognitive theory (SCT) (N=2).

Table 3. Frequently used theoretical frameworks/perspectives

No.	Frequently Used Theoretical Frameworks/Perspectives	Total Number
1	The self-determination theory	8
2	The L2 motivational self system model	4
3	The Vygotsky’s social constructivism	4
4	The self-regulated learning theory	4
5	The social cognitive theory	2
6	Not available	6

4.2 RQ2: What role does AI play in L2 motivation of different language learning domains of EFL?

Synthesizing the 21 included empirical studies suggests that the effect of AI on L2 motivation in in specific dimension of EFL fall into the following two types (Table 4): a motivational effect on various language learning domains of L2 (N = 14) and neutral effect on L2 motivation (N = 2). On the whole, existing studies have unanimously verified that AI plays the facilitative and motivational role in varieties of language learning domains of L2, such as writing, speaking, vocabulary acquisition, grammar and translation. In reviewed studies, the majority of studies (n=8) have proved AI has a positive motivational effect on the improvement of L2 writing skills, followed by grammar (n=3), and finally on vocabulary acquisition (n=1), reading (n=1), as well as speaking (n=1). And the minority of studies (n=2) are also skeptical about this effect.

Table 4. Effects of AI on L2 motivation in in specific dimension of EFL

No.	Effect on L2 motivation to varied specific dimension of EFL	Total Number
1	Positive effect on L2 motivation to writing	8
2	Positive effect on L2 motivation to speaking	1
3	Positive effect on L2 motivation to grammar	3
4	Positive effect on L2 motivation to translation	1
5	Positive effect on L2 motivation to vocabulary	1
6	Neutral effect	2
7	No mention	5

The findings of the study demonstrated that AI significantly augmented learners' motivation to write in a second language as shown in Table 4. This augmentation was primarily attributed to the provision of personalized and immediate feedback, interactivity, a variety of writing tasks, emotional support, and self-directed learning opportunities.

Additionally, the remaining studies (N = 2) held that AI does have a positive effect on L2 motivation, but one highly constrained in some situations considering inherent limitations of GenAI (Wang et al, 2025), learners' individual differences (Wang et al, 2025), like emotional states (Gross, 1998) and technology acceptance (Davis et al., 1989). Therefore, whether AI can have a long-term promoting effect on L2 motivation is still skeptical.

Despite the direct advantage of using Automated Writing Evaluation (AWE) in motivational effect on L2 motivation due to writing feedback, learners are reportedly faced with fallible, non-generic and generic nature of this type of feedback that negatively impacts their motivation and confidence in using educational technology (Hockly, 2019). This is owing to the problems that may naturally exist with AI-assisted learning devices and needs to be improved in terms of accuracy and precision of the produced feedback (Bahari, 2023). In terms of learners' individual differences, According to Sweller's (1988) Cognitive Load Theory (CLT) , when an educational task exceeds a learner's cognitive processing capacity, it can lead to an accumulation of cognitive load. This, in turn, has the potential to hinder learning efficiency and induce anxiety. Foreign language learning anxiety (FLLA) and learning boredom (FLB) have a substantial impact on learners' acceptance of AI chatbots (Wang et al., 2025). It is noteworthy that some learners encounter social exclusion due to their limited familiarity with AI operations, which consequently diminishes their engagement. Therefore, when designing and promoting AI language learning tools in the future, more attention should be paid to learners' individual differences, and learning environments that are more humanized and emotionally supportive, with adjustable loads, should be provided.

4.3 RQ3: Which are the factors that may result in the motivational effects of AI on the second language.

Previous studies have explored the factors that may affect the effectiveness of SLA in AI-assisted learning settings. As shown in Table 5, three major influencing factors have been summarized, ranging from technical, psychological factors and individual differences (like learner proficiency, autonomy and regulation, etc.) Most of the studies have regarded technical factors (n=12) and psychological factors (n=10) as the influencing factors affecting the L2 motivation in AI-mediated contexts. Among these studies, five of them incorporated both technical and emotional factors within the range of factors examined.

Table 5. Factors that may result in the motivational effects of AI technologies on L2

No.	Factors	Total Number
1	Technical factors	12
2	Affective factors	10
3	Individual differences	4

Technical Factors

A review of the extant literature reveals that the technological factors primarily encompass the ease of use and acceptance of the technology, as well as the AI itself. These factors are instrumental in facilitating a personalized approach to language learning through human-computer interactions. This, in turn, provides students with a feedback mechanism that influences their motivation to learn the language. Consequently, this enhances their language skills in an effective manner. 12 studies indicated an association between the motivational effects in L2 acquisition of AI-assisted learning settings and technical factors. These studies concluded that the ease of use in AI systems and interactivity, an inherent feature in AI were positively related to motivational effects on L2 acquisition.

Affective Factors

A comprehensive review of ten studies that examined the impact of emotion on the motivational effects in L2 acquisition of AI-assisted learning settings yielded the following findings: Firstly, the integration of AI in language learning environments has been shown to foster positive emotional experiences, such as enjoyment, thereby mitigating learning anxiety and enhancing L2 motivation. Secondly, the concept of self-efficacy has been demonstrated to serve as a mediating factor between emotional responses and L2 motivation. Specifically, the AI-assisted learning environment has been demonstrated to enhance self-efficacy by improving learners' emotional experience. This, in turn, has been demonstrated to foster motivation in SLA, thereby establishing a positive feedback loop.

In the first place, AI technologies have been demonstrated to assist language learners in mitigating feelings of anxiety associated with the linguistic learning process.

The existing studies have shown that when learners experience enjoyment and satisfaction in AI-assisted foreign language learning, they are more likely to connect

emotionally with their learning process, which can lead to increased motivation (Yuan & Liu, 2025).

The existing reviewed studies have proved that self-efficacy, as one of key constructs of affective factors, is indirectly conducive to learners' L2 motivation. For instance, informal digital learning using AI tools (AI-IDLE) significantly enhanced the FLE and the clarity of learners' ideal L2 self-images (Liu et al., 2024). Learners reported a heightened sense of enjoyment and satisfaction in the AI-assisted environment, which served to reinforce their confidence in their language learning abilities. This, in turn, led to a more pronounced L2 motivation. Specifically, the interaction with AI chatbots has been shown to enhance language skills in learners while providing a non-judgmental environment for practice. This experience has been shown to reduce learning anxiety and enhance self-efficacy, thereby promoting sustained engagement and motivation in English learning.

Individual Differences

In addition to the two aforementioned factors, individual differences such as learner proficiency and learner autonomy were discussed. Regarding the impact of the language proficiency of learners on the motivational effects of AI on the L2 learning, how different foreign language levels of learners react in AI-assisted learning settings has been explored. It was shown that learners with higher language proficiency can better utilize AI technologies, such as chatbots, and show higher motivation for advanced language practice, while learners with lower language proficiency may need AI to offer more supportive functions, such as native language prompts or vocabulary explanations, to assist them in completing tasks more effectively (Huang & Renandya, 2020). This, therefore, requires that the language difficulty of the chatbot should be matched with the language proficiency of the students, so that they can effectively engage in interaction.

Another influential factor is learners autonomy. The utilization of effective emotion regulation strategies assists learners in coping more positively with the challenges and frustrations they encounter during the learning process, thereby maintaining higher motivation for learning. In AI-assisted learning environments, learners with greater autonomy are more likely to actively utilize AI tools to regulate their emotions (Garnefski & Kraaij, 2007). Learners who possess a lower degree of autonomy may encounter more significant challenges in an AI-assisted learning environment. These individuals tend to place greater reliance on external guidance and demonstrate diminished responsiveness to the personalized advice and feedback provided by AI tools. Additionally, they encounter challenges in maintaining high levels of motivation (Namaziandost et al., 2025). Consequently, in order to effectively promote the second language learning motivation of all learners, educators should provide appropriate support and guidance during AI-assisted teaching and learning to help learners gradually improve their autonomy and emotional regulation, so as to better adapt to the technology-integrated learning environment.

4.4 Discussion

The discussion is as follows. RQ1 sought to identify the theoretical frameworks employed in L2 motivation research in AI educational contexts. However, a significant

number of studies did not utilize a theoretical framework or model as a foundation for their research. Researchers primarily used the SDT theory as the basis for the research. In AI-assisted L2 learning settings, due to its personalized learning tutoring model of AI, it requires researchers to focus on the internal motivation state and psychological structure of learners. SDT have deeply and comprehensively analyzed the internal mechanism of learners' motivation from three dimensions. Therefore, this theory can better understand essentially how AI affects learners' L2 motivation.

The research results do indeed confirm that in the AI-assisted learning environment, there is an intrinsic connection between the sources of motivation in the social context and the satisfaction of psychological needs. AI tools play a positive role in meeting the three basic psychological needs of learners, namely autonomy, competence and relatedness, thereby significantly enhancing learners' L2 learning motivation (Ellikkal & Rajamohan, 2024). The AI-driven personalized learning environment is systematically stimulating and meeting these needs by dynamically adjusting the learning content, feedback mechanisms and interaction methods, thereby enhancing the active participation and intrinsic motivation of learners (Xu & Liu, 2025; Yang et al., 2025; Yuan & Liu, 2025).

RQ2 focused on the effects of AI played in L2 motivation of varied specific language learning domains of SLA. An analysis of the literature shows that AI plays the facilitative and motivational role in speaking and writing tasks, while a dialectical perspective on the effects is adopted by some researchers, given the limitations of GenAI, as well as learners' individual differences and the extent of their utilization. In light of these considerations, it is imperative to underscore the cultivation of learners' autonomous learning capabilities and critical thinking abilities. Meanwhile, it is also essential to ensure that there is an appropriate level of reliance on AI technologies. And it is crucial to take into account the individual differences among learners, ensuring that the provision of technical support and guidance is tailored to meet the unique needs of each individual.

RQ3 focused on the factors that probably be responsible for the motivational effects of AI on L2. Four types of factors were identified in the present review: technical factors, the ingredient of psychology, learner proficiency and learner autonomy. This study not only verified the critical role of psychological and technological factors in AI-assisted language learning, but also emphasized the profound impact of individual differences on L2 motivation.

This study also found that purely relying on AI for teaching may be difficult to fully satisfy learners' affective and cognitive needs. In the future, attention should also be paid to how teachers can play a more active role in guiding and regulating under the framework of human-computer collaboration, so as to build a more supportive learning ecology (Cardona et al., 2023).

5. CONCLUSION

The findings showed that there are five major theoretical frameworks applied to AI-assisted language learning for L2 motivation research, among which the self-determination theory (SDT) is the most frequently used theoretical frameworks.

AI plays the facilitative and motivational role in varieties of language learning domains of L2.

There are three factors that might influence the motivational effects of different tasks of EFL, including technical, psychological factors and individual differences.

There are several limitations in this study. In the first place, the study may not include all related publications due to the limitation of library resources. In the second place, The factors influencing the motivational effect of AI in foreign language learning are relatively limited in this research review. Therefore, more influencing factors warrants further investigation.

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