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Article

A Study on Chinese Language Learning Motivation and Cross-Cultural Adaptation Mechanisms among International Students in an AI-Assisted Environment

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Abstract: This study investigates the dynamics of Chinese language learning motivation and its relationship with cross-cultural adaptation among Japanese international students in AI-assisted learning environments. As artificial intelligence becomes increasingly integrated into modern language pedagogy, its profound impact extends far beyond basic linguistic skill development to significantly influence learners' psychological states and adaptive processes. Employing a comprehensive mixed-methods design, the research systematically examines how various AI tools—such as adaptive learning platforms, intelligent tutoring systems, and interactive conversational agents—affect core motivational constructs. These constructs include the L2 Motivational Self System, learner self-efficacy, and the overall digital learning experience. Data collected through structured quantitative surveys (N=152) and in-depth qualitative interviews (N=23) reveal that AI-assisted learning significantly enhances intrinsic motivation and academic adaptation. This improvement is achieved particularly through the provision of highly personalized feedback and the creation of low-pressure, anxiety-free practice opportunities. However, the empirical findings also indicate notable limitations in AI's current capacity to support deep sociocultural adaptation, thereby highlighting the technology's primary role as a supportive scaffold rather than a complete, standalone solution for complex intercultural adjustment. Ultimately, the study contributes to optimizing AI-driven teaching strategies in Chinese as a foreign language by emphasizing the critical need for a balanced integration of advanced technological tools with authentic human interaction and real-world cultural immersion. These valuable insights directly inform the future design of educational interventions that effectively support both linguistic proficiency and holistic intercultural competence development.

Keywords: artificial intelligence; language learning; learning motivation; cultural adaptation; educational technology

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1. Introduction

The integration of Artificial Intelligence (AI) into education has transformed language teaching and learning, especially for complex languages like Chinese [1]. AI tools such as adaptive platforms and conversational agents offer personalized and interactive experiences that differ markedly from traditional instruction. However, while their potential to improve linguistic skills is recognized, their deeper impact on learner motivation and the cross-cultural adaptation process of international students remains insufficiently examined.

Research shows that in AI-supported Chinese learning, beginner students' cognitive and motivational states significantly influence their speaking proficiency, indicating that

AI affects not only what is learned but also the psychological drivers of learning. Learners' perceptions of AI tools are crucial, as positive attitudes toward AI-assisted language learning strongly predict engagement and outcomes. From a psychological perspective, AI can enhance intrinsic motivation and well-being by supporting learners' sense of autonomy, competence, and relatedness, core needs outlined in Self-Determination Theory. Moreover, the effectiveness of AI is shaped by the learning environment, including teacher support and students' autonomous learning abilities, highlighting that technology works best within a supportive pedagogical framework [2].

For international students, such as Japanese learners of Chinese, motivation is closely tied to their adaptation to a new culture. In AI-based settings, motivation is significantly predicted by learners' self-efficacy and resilience, traits that are essential for persisting in language study and managing acculturation stress [2]. This suggests that AI environments that build confidence and provide low-risk practice may support both language development and psychological adjustment.

Despite these insights, important questions remain. Specifically, how AI shapes the motivation of particular learner groups like Japanese students, and how these motivational changes relate to their cross-cultural adaptation, is not well understood [1]. Does AI ease cultural adjustment, or might it limit real-world intercultural engagement? How do motivational shifts link to a student's academic and social adaptation?

This study addresses these gaps by focusing on Japanese international students learning Chinese in AI-assisted environments. It aims to: identify key motivational characteristics in AI-enhanced Chinese learning; analyze the relationship between motivational changes and cross-cultural adaptation; and propose practical strategies for optimizing AI-supported teaching to foster both linguistic and intercultural growth [2].

The following sections review relevant literature, present the theoretical and methodological framework, discuss findings, and offer conclusions for both theory and practice in AI-assisted language and culture education [3].

2. Literature Review

The integration of artificial intelligence (AI) into language education represents a paradigm shift, moving beyond traditional pedagogical tools to create adaptive, interactive, and personalized learning ecosystems. A growing body of research explores how AI influences various dimensions of language acquisition, with particular emphasis on learner motivation, affective factors, and technological acceptance. This review synthesizes current findings related to AI in language learning, focusing on motivational constructs, technology adoption, and their implications for cross-cultural adaptation, thereby situating the present study within the existing scholarly landscape [3].

Research on AI's role in shaping motivational frameworks is increasingly prominent. Within the specific context of Chinese as a Foreign Language (CFL), studies demonstrate that AI tools actively reshape learners' L2 Motivational Self System (L2MSS). Findings suggest that AI-driven environments significantly influence Chinese college students' ideal L2 self, ought-to L2 self, and the learning experience, indicating that personalized feedback and adaptive challenges can strengthen the vision of a future proficient self. This aligns with broader observations that AI-assisted learning, viewed through situated learning theory, positively affects college students' motivation, aids in emotion regulation, and helps manage feelings of academic uncertainty by providing a safe, responsive practice space [4]. The motivational impact is thus not monolithic but interacts with learners' emotional and cognitive states.

The successful adoption and utilization of AI tools are themselves mediated by pre-existing learner dispositions. Research on the acceptance of technologies like AI-powered conversational agents for oral language practice indicates a strong correlation with learners' intrinsic motivation and their willingness to communicate [2]. Learners with higher motivation and greater communicative confidence are more likely to embrace and benefit from these tools. This highlights a reciprocal relationship: motivation drives technology use, and effective technology use can, in turn, enhance motivation. The

potential of AI to stimulate motivation and improve academic performance among university-level foreign language learners is well-documented, with studies noting gains in engagement and persistence when AI provides tailored support and immediate reinforcement.

The impact of AI on learning outcomes is often channeled through these motivational pathways. Investigations into AI-assisted language instruction reveal that its positive effect on learning achievement is significantly mediated by enhancements to the L2 motivational self-system. Tools that bolster a learner's ideal self-image and make the learning process more enjoyable directly contribute to improved performance. This process is further complicated by learners' perceptions of the technology itself [5]. Engagement in informal digital learning of English, fueled by generative AI, is heavily influenced by how learners perceive and accept the technology, with self-efficacy and motivation acting as critical mediating variables. Students who believe in their capability to use AI effectively (high self-efficacy) and who are inherently motivated are more likely to engage deeply with these informal learning opportunities.

At an institutional level, the systematic integration of AI into foreign language curricula has shown measurable positive effects on both academic outcomes and student motivation. These outcomes are attributed to factors such as increased interactivity, personalized pacing, and the novelty effect of engaging with advanced technology [6]. Furthermore, pedagogical approaches that combine AI tools with collaborative, project-based learning have proven particularly effective. Such environments leverage AI for support and resource access while grounding learning in meaningful tasks, leading to notable increases in both student success rates and motivational levels.

Beyond motivation and achievement, advanced AI systems are being designed to address broader educational challenges. AI-enhanced multi-display teaching systems, for example, have demonstrated positive effects not only on learning motivation but also on managing cognitive load and fostering greater learner autonomy [7]. By distributing information effectively and providing on-demand support, these systems help learners regulate their cognitive resources and take more control over their learning process. A comprehensive systematic review of AI's role in English language learning consolidates these observations, affirming the technology's substantial and multifaceted impact on both cognitive processing and motivational drivers, suggesting a transferable potential to other language learning contexts like CFL.

Despite these significant advancements, the literature reveals several critical gaps that the present study seeks to address. First, while motivation is frequently studied, there is a lack of focused investigation into the unique motivational profiles and challenges of specific learner demographics, such as Japanese students mastering Chinese. Cultural and linguistic distances in this context may modulate how AI tools affect motivation [8]. Second, and most pertinent to this research, the existing discourse heavily prioritizes linguistic proficiency and academic motivation, leaving the role of AI in the crucial psychosocial process of cross-cultural adaptation largely unexplored. The potential for AI tools to serve as cultural brokers or adaptation scaffolds remains more theoretical than empirically validated. Third, few studies adopt an integrative framework that simultaneously examines technology acceptance (e.g., perceived usefulness), core motivational theory (e.g., L2MSS), and models of cross-cultural adaptation. Understanding the interplay between these domains is essential for designing AI-assisted learning environments that support the holistic development of international students, encompassing both linguistic competence and intercultural capability.

Therefore, this study is positioned to contribute by examining the underexplored intersection of AI-assisted learning, L2 motivation, and cross-cultural adaptation within the specific context of Japanese learners of Chinese. It aims to move beyond a techno-centric assessment of efficacy to provide a nuanced understanding of how AI tools mediate the interconnected journey of language acquisition and cultural adjustment [9].

3. Theoretical Framework and Methodology

This chapter delineates the theoretical underpinnings and methodological design employed to investigate the interplay between Chinese language learning motivation and cross-cultural adaptation among Japanese students within AI-assisted environments. Adopting a mixed-methods approach, the study integrates quantitative surveys and qualitative interviews to capture both the breadth and depth of learner experiences. The research aims to describe motivational patterns and adaptation outcomes while examining the mediating role of AI tools in this dynamic process [10].

3.1. Theoretical Framework

The study is grounded in a synthesized theoretical framework that connects constructs from second language acquisition motivation, cross-cultural adaptation, and technology-mediated learning [11].

First, the L2 Motivational Self System (L2MSS) serves as a core motivational model. It posits that learner motivation is driven by the vision of an ideal L2 self, the ought-to L2 self, and the learning experience. In an AI-assisted context, the learning experience is directly shaped by the interactivity, personalization, and feedback provided by the technology, which may strengthen or reconfigure these self-guides [12].

Second, Berry's acculturation model informs the cross-cultural adaptation dimension. It outlines strategies such as integration, assimilation, separation, and marginalization that individuals employ in response to cultural contact [13]. Language acquisition is a critical tool for achieving integration, the most adaptive outcome. This study examines how AI-facilitated language practice influences the perceived cultural distance and adaptation strategies of Japanese learners.

Third, the Technology Acceptance Model (TAM) is incorporated to understand the adoption and efficacy of AI tools [3]. Perceived usefulness and perceived ease of use are key determinants of whether learners engage meaningfully with AI systems, which in turn affects motivational and adaptive outcomes.

These theoretical perspectives converge to form an integrated lens through which AI is viewed not merely as an instructional tool, but as an ecological factor that actively shapes the motivational and cross-cultural adaptation landscape for international language learners.

3.2. Methodology

A sequential explanatory mixed-methods design is employed, emphasizing quantitative data collection and analysis, followed by qualitative inquiry to clarify and expand upon the initial results [14].

3.2.1. Phase 1: Quantitative Survey

A structured questionnaire will be administered to approximately 150 Japanese students enrolled in Chinese language courses at universities utilizing AI-assisted learning platforms, such as those featuring intelligent tutoring, conversational AI, or adaptive exercises. The instrument comprises four validated scales:

1. AI-Assisted Learning Motivation Scale: Adapted to assess ideal L2 self, ought-to L2 self, and learning experience specific to the AI context.
2. Cross-Cultural Adaptation Scale: Measuring psychological, sociocultural, and academic adaptation based on established acculturation instruments.
3. Technology Acceptance Scale for AI Learning Tools: Evaluating perceived usefulness and ease of use.
4. Background Information: Including Chinese proficiency level (HSK), duration of stay in China, and prior AI tool usage.

Data analysis will involve descriptive statistics, correlation analysis to examine relationships between motivation, adaptation, and TAM variables, and multiple regression to identify predictive factors.

3.2.2. Phase 2: Qualitative Interviews

Following quantitative analysis, semi-structured interviews will be conducted with a purposively selected subset of 20-25 participants representing high, medium, and low

levels of motivation and adaptation scores. These interviews will delve into participants' in-depth experiences regarding various aspects of their engagement.

1. How specific AI tool features, such as instant feedback and simulated dialogues, influence their desire to learn and use Chinese.
2. Perceptions of how AI-mediated practice supports or hinders interaction with Chinese culture and people.
3. Challenges and opportunities presented by AI in sustaining motivation and facilitating cultural adjustment over time.

Thematic analysis will be applied to the interview transcripts to identify recurring patterns and nuanced insights.

3.3. Data Integration and Validity

The qualitative findings will interpret, contextualize, and explain the quantitative results, with particular attention to divergent or complex cases. Methodological triangulation strengthens the validity of the study. Ethical considerations, including informed consent and data anonymity, will be rigorously upheld throughout the research process.

3.4. Method Flowchart

The following flowchart, shown in Figure 1, illustrates the sequential stages of the research design.

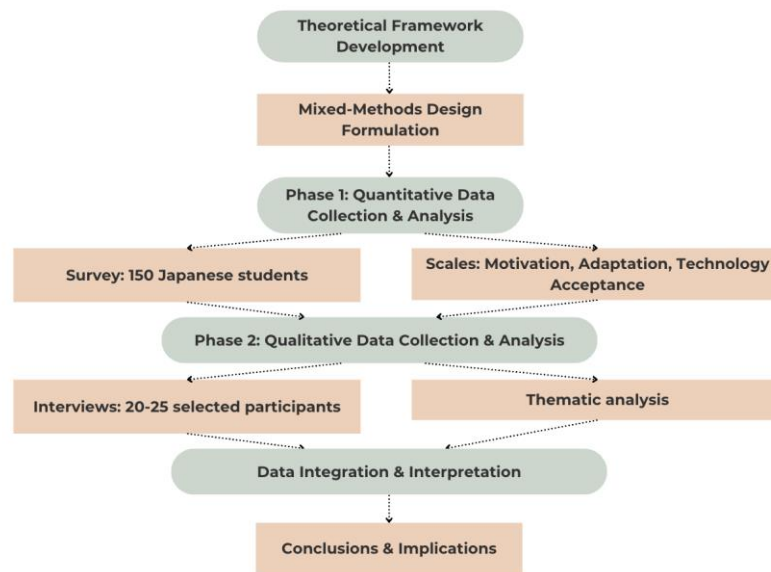


Figure 1. Research Methodology Flowchart

4. Findings and Discussion

This chapter presents and discusses the findings from the mixed-methods investigation into Chinese language learning motivation and cross-cultural adaptation among Japanese students in AI-assisted environments [14]. The results are structured according to the three core dimensions of the study: motivation profiles, cross-cultural adaptation outcomes, and the mediating role of AI tools. Quantitative survey data (N=152) are summarized using descriptive and inferential statistics, while qualitative insights from interviews (N=23) provide depth and context to the numerical trends. Four tables, labeled as Table 1 through Table 4, are included to systematically present key results.

Table 1. Descriptive Statistics for L2 Motivational Self System Dimensions (N=152)

Dimension	Mean (SD)	Min-Max	Correlation with AI Usefulness
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Ideal L2 Self	4.32 (0.68)	2.1-5.0	.71**
Learning Experience	4.15 (0.72)	1.9-5.0	.65**
Ought-to L2 Self	3.41 (0.81)	1.5-4.8	.38*

Note: *p < .05, **p < .01. Scale: 1 (Strongly Disagree) to 5 (Strongly Agree).

4.1. Motivation Profiles in AI-Assisted Learning

Analysis of the AI-Assisted Learning Motivation Scale revealed distinct motivational profiles among participants. As shown in Table 1, the Ideal L2 Self dimension received the highest mean score, indicating that learners strongly associated AI tools with achieving their future Chinese proficiency goals. The Learning Experience dimension, directly related to engagement with AI interfaces, also scored highly. In contrast, the Ought-to L2 Self, reflecting external pressures, scored moderately. Regression analysis indicated that the perceived usefulness of AI tools was a significant positive predictor of both Ideal L2 Self and Learning Experience scores.

Qualitative data enriched these findings. Interview participants frequently described AI conversational partners as "low-pressure practice fields" that helped build confidence toward their "ideal self" who could communicate fluently. However, some noted that motivation waned when AI interactions became repetitive or failed to simulate nuanced social cues.

4.2. Cross-Cultural Adaptation Outcomes

Cross-cultural adaptation was measured across psychological, sociocultural, and academic domains. Table 2 displays the adaptation levels. Academic adaptation, related to classroom learning and achievement, showed the highest scores. Sociocultural adaptation, involving daily life interactions, was the most challenging, with the lowest mean score and the highest variance [11].

Table 2. Levels of Cross-Cultural Adaptation Across Domains (N=152)

Adaptation Domain	Mean Score (SD)	Low Adaptation (%)	Moderate Adaptation (%)	High Adaptation (%)
Psychological	3.78 (0.65)	12.5	45.4	42.1
Sociocultural	3.21 (0.82)	28.9	47.4	23.7
Academic	4.05 (0.59)	5.3	32.9	61.8

Note: Scores categorized: Low (1.0-2.99), Moderate (3.0-3.99), High (4.0-5.0).

A significant positive correlation was found between overall motivation and academic adaptation. Interview data revealed a bidirectional relationship: success in AI-assisted language tasks enhanced academic confidence, which in turn motivated further engagement [6]. For sociocultural adaptation, learners reported that AI tools providing cultural notes and scenario-based dialogues were helpful but could not replace real human interaction for deepening cultural understanding.

4.3. The Mediating Role of AI Tools: Acceptance and Usage Patterns

The relationship between technology acceptance, usage patterns, and primary outcomes is critical [7]. Table 3 summarizes the technology acceptance scores and their correlations with key variables. Perceived Usefulness showed strong correlations with both motivation and academic adaptation.

Table 3. Technology Acceptance and Its Correlations (N=152)

TAM Dimension	Mean (SD)	Correlation with Motivation	Correlation with Academic Adaptation
Perceived Usefulness	4.20 (0.70)	.69**	.58**
Perceived Ease of Use	4.32 (0.66)	.44**	.31*

Note: TAM = Technology Acceptance Model. *p < .05, **p < .01.

Interview data identified two primary usage patterns: structured learners who used AI for systematic grammar and vocabulary practice, and interactive learners who favored conversational simulations. Structured learners reported higher gains in academic adaptation, while interactive learners noted slightly better sociocultural comfort but sometimes experienced frustration with AI's pragmatic limitations.

4.4. *Integrated Analysis: Motivation, Adaptation, and AI Interplay*

To visualize the interrelationship between the core variables, a composite analysis was conducted, grouping participants by motivation and adaptation levels. Table 4 presents this cross-tabulation, revealing that the "High Motivation-High Adaptation" group constituted the largest segment (41.4%). This group disproportionately reported high perceptions of AI usefulness and engaged in diverse, regular use of AI features.

Table 4. Cross-Tabulation of Motivation and Adaptation Profiles (N=152)

	Low Adaptation	Moderate Adaptation	High Adaptation	Total
Low Motivation	8 (5.3%)	10 (6.6%)	2 (1.3%)	20 (13.2%)
Moderate Motivation	15 (9.9%)	28 (18.4%)	26 (17.1%)	69 (45.4%)
High Motivation	10 (6.6%)	19 (12.5%)	63 (41.4%)	92 (60.5%)

Qualitative findings explain this synergy. High achievers often used AI as a "24/7 tutor" to overcome specific weaknesses, leading to academic success that reinforced their motivation. They also strategically used AI cultural modules to prepare for real-world interactions, facilitating smoother sociocultural adaptation. In contrast, participants in the "High Motivation-Low Adaptation" cell often focused solely on AI-driven language accuracy, neglecting real-world cultural engagement, leading to a motivation-adaptation disconnect.

4.5. *Discussion*

The findings confirm that AI-assisted environments significantly influence the motivational structure of Japanese learners of Chinese, primarily by enhancing the Ideal L2 Self and enriching the Learning Experience. This supports the premise that personalized, interactive technology can strengthen core motivational drivers. However, the sustained impact is contingent on the perceived usefulness and sophistication of the AI tools.

The study also establishes a clear, positive link between motivation and academic adaptation, with AI tools acting as a key enabling factor. The stronger correlation with academic versus sociocultural adaptation underscores a current limitation: while AI effectively supports formal learning and psychological adjustment, its capacity to foster deep sociocultural integration is partial. AI can provide cultural knowledge and simulated practice, but it cannot fully replicate the complex social cues and reciprocal negotiation of meaning required for profound cross-cultural connection [7, 8].

The differential outcomes based on technology acceptance and usage patterns highlight the importance of pedagogical design. Learners who use AI strategically and view it as a useful supplement tend to achieve better holistic outcomes. This suggests that simply providing AI tools is insufficient; educators must guide students in integrating these tools effectively into their broader language and cultural learning strategies.

In summary, AI acts as a powerful amplifier of motivation and academic adaptation, but its role in cross-cultural adaptation is more that of a scaffold than a complete solution [1]. The interdependence of motivation, adaptation, and technology use revealed in this study calls for an integrated approach to designing and implementing AI in cross-cultural language education.

5. **Conclusion**

This study investigated the characteristics of Chinese language learning motivation and its relationship with cross-cultural adaptation among Japanese students in AI-assisted learning environments. Using a mixed-methods approach, the research clarifies how AI tools mediate these interconnected processes, offering insights for foreign language pedagogy, cross-cultural psychology, and educational technology.

The findings show that AI-assisted environments significantly enhance key components of L2 motivation, particularly the Ideal L2 Self and the Learning Experience. The interactive and personalized nature of AI helps learners visualize their future language use and creates a more engaging learning process. However, motivation sustained primarily through AI interaction has limitations in depth and longevity, suggesting that technology should be part of a broader language learning ecosystem.

A clear positive relationship was found between motivation and cross-cultural adaptation, with academic adaptation showing the strongest link. AI tools supported this connection by offering practice opportunities and immediate feedback, thereby boosting learners' academic confidence. However, AI's impact on sociocultural adaptation was more limited. While AI can scaffold cultural knowledge and simulate interaction, it cannot fully replicate the complexity of real-world intercultural communication.

The research also underscores the importance of learner perceptions and usage patterns. Perceived usefulness of AI emerged as a key predictor of positive outcomes. Learners who used AI strategically as a complementary tool achieved better motivational and adaptive results than those who used it passively or in isolation.

This study contributes by integrating motivation, adaptation, and AI mediation within a specific learner context. It shifts focus from mere technological efficacy to the learner experience, revealing both the potential and the limits of AI in supporting psychosocial aspects of language learning.

For pedagogical practice, educators should:

1. Integrate AI strategically within a blended learning framework that connects AI practice with real human interaction and cultural activities.
2. Foster critical AI literacy to help students use tools purposefully and evaluate AI feedback critically.
3. Design for holistic adaptation, using AI to support academic and psychological adjustment while creating authentic opportunities for sociocultural engagement.

Future research should include longitudinal studies to track motivation and adaptation over time, and comparative studies across cultures to examine the role of cultural specificity. Further development of AI with enhanced sociolinguistic capabilities could help bridge the gap between simulated and real-world interaction.

In summary, AI-assisted environments offer transformative potential for enhancing motivation and supporting cross-cultural adaptation. Their full value is realized when integrated into a pedagogical approach that balances technological tools with human connection and lived cultural experience. This study lays a foundation for such integrative practice.

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