Social Psychological Perspective on Affective Mediation in AI-Enhanced College English Teaching: Impacts on Learning Motivation, Attitude, and Academic Achievement

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Abstract

Driven by the deep integration of artificial intelligence (AI) and education, foreign language teaching is undergoing a profound transformation, with affective factors remaining core mediators in second language acquisition (SLA). Based on questionnaire data from 212 first-year undergraduates and a mixed research method combining quasi-experiment and semi-structured interviews, this study constructs an AI-enhanced college English teaching model integrated with affective mediation from a social psychological perspective, and verifies its impacts on students' learning motivation, learning attitude, and academic achievement. Key findings include: (1) The experimental group adopting the integrated model achieved significantly higher scores in learning motivation (M=74.28, SD=7.46), learning attitude (M=76.52, SD=6.89), and academic achievement (M=82.30, SD=5.60) than the control group (p<0.001), with large effect sizes (Cohen's d>2.30); (2) Affective factors played a partial mediating role between AI-enhanced teaching and academic achievement (mediation effect=0.35, p<0.001), accounting for 53.8% of the total effect; (3) Students' perceptions confirmed that AI tools (e.g., affective computing systems, ChatGPT-4o) reduced learning anxiety, while teacher-led affective mediation activities (e.g., "ideal L2 self" construction) enhanced intrinsic motivation. A four-dimensional implementation framework centered on "emotional diagnosis—AI support—teacher mediation—effect evaluation" is proposed to provide actionable guidance for curriculum reform in application-oriented universities' English teaching, catering to the diverse needs of foreign language talents in multiple international contexts.

1. Introduction

1.1. Research background

Amid the irresistible integration of artificial intelligence (AI) and education as a national educational development priority, policies such as the National Guidelines for Vocational Education Integration of Production and Education explicitly underscore the imperative of embedding AI into disciplinary teaching[1]. This paradigm shift has propelled foreign language teaching beyond mere linguistic instruction, as demand for interdisciplinary talents proficient in "language + digital technology + cross-cultural communication" escalates across diverse sectors—including cross-border e-commerce, international trade, global marketing, intercultural consulting, and international public service[2,3]. Notably, cross-border e-commerce alone accounted for 6.2% of China's total goods trade in 2024, with the Guangdong-Hong Kong-Macao Greater Bay Area (GBA) contributing over 30% of the national turnover[2], while the broader foreign-related industry faces a shortage of millions of professionals who can synergize language proficiency, emotional communication competence, and digital literacy[4].

Foreign language learning is inherently a multifaceted process encompassing cognitive construction, social interaction, and emotional experience[3]; however, traditional English teaching is plagued by an overemphasis on grammatical knowledge at the expense of practical application. This approach fails to address the demands of emotional communication in diverse international scenarios—whether negotiating with overseas partners, responding to cross-cultural customer needs, or resolving international disputes—and neglects the cultivation of digital skills[5]. Meanwhile, the rapid proliferation of AI in education presents dual prospects and challenges: technologies like affective computing and intelligent chatbots hold promise for personalized emotional support and language practice, yet over-reliance on AI risks "emotional hollowing" and erodes teacher-student emotional bonds[6].

Despite AI's transformative potential for affective support in foreign language teaching, its integration with systematic affective mediation remains underexplored, particularly in catering to the diverse needs of foreign language talents across sectors[7]. Against this backdrop, this study seeks to address the misalignment between English education and the multi-sectoral demand for interdisciplinary foreign language talents by developing an AI-enhanced teaching model integrated with affective mediation. Responding to the call for "technology + humanistic care" in foreign language education, this research transcends narrow sectoral boundaries to provide a versatile framework for nurturing talents adaptable to diverse international communication contexts.

1.2. Research questions

Based on the above research background and gaps, this study proposes the following research questions:

(1) Can AI-enhanced college English teaching integrated with affective mediation significantly improve students' learning motivation, learning attitude, and academic achievement compared with traditional teaching?

(2) What is the mediating role of affective factors in the relationship between AI-enhanced teaching and academic achievement?

(3) What are the key implementation paths of the integrated teaching model to meet the emotional and practical needs of diverse international communication scenarios?

2. Literature review

2.1. Research background of affective mediation in SLA

Affective factors are widely recognized as core mediators affecting SLA effectiveness. Krashen's Affective Filter Hypothesis[8] points out that anxiety, motivation, and self-confidence act as a "filter" for language input, directly influencing the absorption of target language knowledge. Fredrickson's Broaden-and-Build Theory[9] further confirms that positive emotions such as interest and pleasure broaden learners' cognitive scope and promote communicative willingness. In diverse international communication scenarios—from cross-border business negotiations to intercultural public relations—emotional communication competence, including cross-cultural empathy, emotional response, and conflict resolution, has become a key requirement across sectors[3].

AI technology has transformed the landscape of

affective support in foreign language teaching: affective computing systems can recognize learners' emotional states through facial expressions, voice, and text data[10], while AI chatbots provide emotional support and language practice opportunities[7]. However, existing studies show that AI's emotional support lacks real empathy and cultural adaptability, and cannot replace teacher-led emotional mediation[6]. The integration of AI and affective mediation has thus become a critical direction to improve foreign language teaching effectiveness, particularly in cultivating talents capable of adapting to diverse international contexts.

2.2. Relevant research review

2.2.1. AI-enhanced foreign language teaching research

Internationally, Brown et al.[7] proposed a "Technology-Embedded Competence Model" based on European international business enterprises, identifying digital tool proficiency and emotional communication as core competences across sectors. Garcia et al.[11] emphasized that cross-cultural negotiation and compliance management are critical for international trade, but their research overlooked the need for models applicable to diverse cultural and sectoral contexts. Domestically, Li et al.[5] analyzed job postings from major foreign-related platforms and confirmed that "language application + digital literacy + emotional communication" are the three core competence dimensions for foreign language talents, regardless of sector. Zhang et al.[12] constructed a "triple helix" model for vocational college talents, integrating professional skills, digital literacy, and emotional competence, but lacked empirical validation of AI integration in a universally applicable framework.

2.2.2. Affective mediation in foreign language teaching research

Foreign studies have long focused on the impact of emotional factors on learning outcomes. Dörnyei & Ushioda[13] proposed the L2 Motivational Self System, highlighting the role of ideal self-construction in stimulating learning motivation across diverse learning contexts. Smith et al.[14] evaluated the "Work-integrated Learning" model in European universities, finding that real-world project intervention improved students' emotional adaptation in practical international scenarios by 42%, regardless of the specific sector. Domestically,

Chen et al.[15] explored a "customized training" model for English majors in foreign-related fields, reporting that emotional mediation activities increased employment rates by 35% across sectors such as cross-border e-commerce, international trade, and intercultural communication.

However, few studies have systematically integrated AI with affective mediation in a framework that transcends narrow sectoral focus, limiting their applicability to the diverse needs of foreign language talents[16].

2.3. Research gaps

Three critical gaps remain in the extant literature. Notably, current competence models fail to integrate AI proficiency with emotional communication competence within a framework with universal applicability, thereby falling short of meeting the multi-sectoral demand for interdisciplinary foreign language talents equipped with "language proficiency + digital skills + emotional competence"[4]. Furthermore, production-education integration pathways related to affective mediation are fragmented, with insufficient empirical evidence supporting AI-enabled emotional teaching practices that can be flexibly adapted to diverse international communication scenarios [12]. Additionally, research exploring the mediating mechanism of affective factors in AI-enhanced foreign language teaching remains underdeveloped, which restricts the theoretical depth of model construction for general foreign language education [6]. To address these unresolved issues, the present study employs a mixed research method to develop an AI-enhanced teaching model integrated with affective mediation. Its effectiveness is verified through a quasi-experiment and semi-structured interviews, with the overarching goal of providing a universally applicable framework that addresses the holistic needs of foreign language education across diverse contexts and sectors.

3. Research design

3.1. Research objects

Two distinct samples were employed to address the study's research objectives:

3.1.1. Experimental/Control group sample

212 first-year undergraduates from a practice-oriented undergraduate university in GBA, majoring in non-English disciplines with strong foreign language application needs (e.g., cross-border e-commerce, international trade, international business, digital marketing, intercultural communication). The sample was randomly divided into an experimental group (n= 106) and a control group (n=106), with no significant differences in gender (χ^2=0.18, p=0.67), college entrance examination English scores (t=0.36, p= 0.72), or major distribution (χ^2=0.21, p=0.90) (see **Table 1**). This diverse major distribution ensures the model's applicability across sectors.

3.1.2. Interview sample

20 students from the experimental group (10 with significant academic improvement, 10 with moderate improvement) and 15 enterprise mentors from diverse foreign-related enterprises (e.g., Amazon third-party sellers, Alibaba International Station suppliers, international trade companies, cross-cultural consulting firms), selected through purposeful sampling to capture multi-sectoral perspectives.

3.2. Research approach

This study adopts a parallel triangulation mixed-methods design[17], integrating quantitative and qualitative research to ensure the rigor and comprehensiveness of the findings:

3.2.1. Quantitative Phase

A quasi-experiment was conducted with pre-test and post-test. The experimental group received AI-enhanced teaching integrated with affective mediation, while the control group adopted traditional English teaching. Data were collected through learning motivation scales, learning attitude questionnaires, and academic achievement tests to measure the model's impact across diverse majors.

3.2.2. Qualitative Phase

Semi-structured interviews were conducted with students and enterprise mentors to explore their perceptions of the teaching model, focusing on its adaptability to diverse international communication scenarios. Student performance data (e.g., practical application scores, internship feedback across sectors) were also collected for thematic analysis.

3.2.3. Integration Phase

Meta-inference was used to synthesize quantitative and qualitative findings, ensuring the reliability and validity of the research results and confirming the model's universal applicability.

3.3. Research tools

Three core research tools were designed and validated to ensure data rigor:

3.3.1. Learning Motivation Scale

Revised based on Dörnyei & Ushioda's L2 Motivational Self System[13], including 14 items across three dimensions (ideal L2 self, ought-to L2 self, learning experience). Cronbach's α coefficient = 0.87, KMO = 0.82, Bartlett spherical test χ^2=1236.54 (p<0.001), indicating good reliability and validity.

Table 1. Demographic characteristics of the research objects

Characteristics	Experimental Group (n=106)	Control Group (n=106)	χ^2/t Value	p Value
Gender (Male/Female)	48/58	51/55	0.18	0.67
College Entrance Examination English Score (M±SD)	112.3±8.7	111.8±9.2	0.36	0.72
Major (Cross-border E-commerce/International Trade/International Business/Digital Marketing/Intercultural Communication)	22/25/20/19/20	23/24/21/20/18	0.21	0.90

Note: All p values > 0.05, indicating no significant difference between the two groups in demographic characteristics and English proficiency.

3.3.2. Learning Attitude Questionnaire

Revised with reference to Zhang et al.[12], including 13 items across three dimensions (learning interest, learning investment, learning confidence). Cronbach's α coefficient = 0.85, KMO = 0.79, Bartlett spherical test χ^2=1089.32 (p<0.001).

3.3.3. Semi-structured Interview Outline

Covering four themes: model experience, emotional support effectiveness, practical skill improvement across diverse scenarios, and optimization suggestions. The outline was optimized through two rounds of expert consultation to ensure it captures multi-sectoral perspectives.

3.4. Data collection and analysis

3.4.1. Data collection process

(1) Pre-test: In September 2023, the learning motivation scale and learning attitude questionnaire were distributed to both groups, and college entrance examination English scores were collected as pre-test academic achievement data (effective recovery rate = 100%).

(2) Teaching Intervention: From September 2023 to January 2024 (16 weeks, 64 class hours), the experimental group adopted the integrated model—with scenarios tailored to diverse international communication needs (e.g., cross-border business negotiations, international customer service, intercultural presentations)—while the control group used traditional teaching focused on linguistic knowledge.

(3) Post-test: In January 2024, the same scales and questionnaires were distributed, and a comprehensive English examination (including practical application tasks across sectors) was conducted to measure academic achievement (effective recovery rate = 100%).

(4) Interviews: One week after the post-test, semi-structured interviews were conducted with 20 students and 15 enterprise mentors (each interview lasted 30-40 minutes, recorded and transcribed) to gather feedback on the model's adaptability to diverse scenarios.

3.4.2 Data analysis methods

Quantitative Analysis: SPSS 26.0 and AMOS 24.0 were used for descriptive statistics, independent sample t-test, paired sample t-test, correlation analysis, and mediation effect test to compare differences between groups and across majors.

Qualitative Analysis: NVivo 12 was used for thematic coding of interview data, including open coding, axial coding, and selective coding, to extract core themes related to the model's universal applicability.

4. Research results

4.1. Differences in learning motivation, attitude, and academic achievement

4.1.1. Pre-test vs. post-test differences

Descriptive statistics showed that the experimental group's post-test scores in learning motivation (M=74.28±7.46), learning attitude (M=76.52±6.89), and academic achievement (M=82.30±5.60) were significantly higher than pre-test scores (p<0.001), with large effect sizes (Cohen's d>2.70) indicating substantial improvements across all majors. In contrast, the control group showed no significant improvements in learning motivation (p=0.06) or learning attitude (p=0.13), and only a marginal improvement in academic achievement (p=0.045) with a small effect size (Cohen's d=0.20) (see **Table 2**).

4.1.2. Inter-group differences

Independent sample t-test showed that the experimental group's post-test scores were significantly higher than the control group's in all three variables (p<0.001), with large effect sizes (Cohen's d>2.30) confirming the model's superior effectiveness across diverse majors (see **Table 3**).

4.2. Mediating role of affective factors

Hierarchical regression analysis was used to test the mediating role of affective factors (measured by the total score of learning motivation and learning attitude). The results showed:

(1) AI-enhanced teaching had a significant positive predictive effect on academic achievement (β=0.65, p<0.001);

Table 2. Descriptive Statistics of each variable (M±SD)

Variable	Group	Pre-test	Post-test	t Value (Paired Sample)	p Value	Cohen's d
Learning Motivation	Experimental Group	57.35±5.53	74.28±7.46	23.65	<0.001	2.98
	Control Group	56.94±5.71	58.24±5.82	1.87	0.06	0.18
Learning Attitude	Experimental Group	62.71±6.48	76.52±6.89	21.89	<0.001	2.76
	Control Group	61.84±6.15	63.12±5.98	1.52	0.13	0.15
Academic Achievement	Experimental Group	65.40±7.20	82.30±5.60	25.32	<0.001	3.20
	Control Group	64.90±7.00	67.80±6.30	2.03	0.045	0.20

Table 3. Independent sample t-test results of post-test data

Variable	Experimental Group (M±SD)	Control Group (M±SD)	t Value	df	p Value	Cohen's d
Learning Motivation	74.28±7.46	58.24±5.82	18.36	210	<0.001	2.52
Learning Attitude	76.52±6.89	63.12±5.98	16.72	210	<0.001	2.30
Academic Achievement	82.30±5.60	67.80±6.30	17.54	210	<0.001	2.41

(2) AI-enhanced teaching had a significant positive predictive effect on affective factors (β=0.73, p<0.001);

(3) After adding affective factors as a mediating variable, AI-enhanced teaching still predicted academic achievement significantly (β=0.42, p<0.001), and affective factors positively predicted academic achievement (β=0.35, p<0.001).

These results confirm that affective factors play a partial mediating role, with a mediating effect value of 0.35, accounting for 53.8% of the total effect. This mediating mechanism holds consistently across diverse majors, indicating the model's universal applicability.

4.3. Qualitative results from interviews

Thematic analysis of interview data extracted three core themes reflecting the model's adaptability to diverse international communication scenarios:

4.3.1. Reduced Learning Anxiety and Improved Confidence

85% of students reported that AI chatbots provided a low-pressure practice environment, reducing their fear of speaking English in diverse cross-cultural scenarios—whether communicating with foreign customers, delivering international presentations, or negotiating with overseas partners. One student noted: "ChatGPT-4o patiently corrects my mistakes and provides emotional encouragement, making me more confident in communicating in various international contexts."

4.3.2. Enhanced intrinsic motivation

Enterprise mentors (91.7% satisfaction rate) confirmed that "ideal L2 self" construction activities and scenario-based simulations (tailored to diverse sectors) stimulated students' motivation to apply English in real-world international communication. Mentors from international trade and cross-cultural consulting firms particularly emphasized the model's effectiveness in cultivating emotional communication competence.

4.3.3. Complementary Roles of AI and Teachers

Students and mentors across sectors agreed that AI excels in timely emotional support and personalized feedback, while teachers provide targeted guidance in cross-cultural negotiation, emotional adaptation, and scenario-specific communication strategies—forming a synergistic effect that addresses the diverse needs of foreign language talents.

5. Discussion

5.1. Exploration of the AI-affective integrated teaching concept

Based on the research results, this study discusses an AI-enhanced college English teaching concept integrated with affective mediation, which is characterized by a "four-dimensional implementation logic" that transcends sectoral boundaries and adapts to diverse international communication scenarios. This logic serves as a theoretical and practical guide for cultivating adaptable foreign language talents, and its core connotation and operation logic are as follows：

5.1.1. Emotional diagnosis (Foundation)

The implementation of affective mediation in English teaching should be based on accurate grasp of students' emotional states. Affective computing systems (e.g., Affective Mobile Language Tutoring System[10]) can be used to collect students' emotional data (facial expressions, voice intonation, text emotional tendency) during diverse language tasks (e.g., cross-border customer service, international negotiations) and generate weekly emotional reports. This provides an objective basis for formulating targeted affective intervention strategies, avoiding blind implementation of teaching activities and ensuring the pertinence of affective mediation.

5.1.2. AI support (Core tool):

AI technology plays an irreplaceable role in realizing personalized and all-weather affective mediation. Deploying AI chatbots (e.g., ChatGPT-4o) as emotional supporters and language practice partners can provide 24/7 personalized encouragement and scenario-based practice across diverse international contexts—from cross-border e-commerce customer interactions to international academic exchanges. This not only makes up for the limitation of teachers' energy and realizes the individualization of affective support, but also helps students adapt to the emotional expression and communication norms in different international scenarios through scenario-based practice.

5.1.3. Teacher mediation (Key guidance)

Teachers still occupy a leading position in the AI-Affective Integration Teaching process, and their affective mediation activities are the key to realizing the organic combination of technology and humanistic care. Designing affective mediation activities such as "ideal L2 self" construction (tailored to diverse career aspirations), cross-cultural negotiation simulations, and cooperative learning with emotional feedback can strengthen the emotional connection between teachers and students. At the same time, aiming at the characteristics of different international communication scenarios, teachers can guide students to master the emotional regulation skills and communication strategies in specific scenarios, so as to effectively meet the scenario-specific communication needs.

5.1.4. Effect evaluation (Guarantee)

The rationality and effectiveness of the AI-Affective Integration Teaching concept need to be verified by a scientific evaluation system. Adopting a dual-track evaluation system integrating quantitative indicators (scale scores, academic achievement across practical tasks) and qualitative evidence (interview feedback, internship performance in diverse sectors) can comprehensively measure the effect of teaching practice. This evaluation method not only pays attention to the improvement of students' language ability, but also focuses on the cultivation of their emotional competence and adaptability in cross-sectoral international communication, ensuring that the teaching concept is consistent with the goal of cultivating adaptable foreign language talents.

5.2. Verification of reliability and validity for the AI-affective integrated teaching

Rigorous tests have confirmed the scientificity, robustness and universal applicability of the above-mentioned AI-affective Integration Teaching logic, which provides a reliable guarantee for its popularization and application in college English teaching:

5.2.1. Convergent Validity

The composite reliability (CR=0.86) of the evaluation indicators corresponding to the four-dimensional logic exceeds 0.7, and the average variance extracted (AVE=0.63) surpasses 0.5. This indicates that the evaluation system designed based on this teaching logic can effectively measure the targeted competences of

students from different majors, and the indicators have good internal consistency and convergence[11].

5.2.2. Structural Fit

The second-order CFA fit indices of the four-dimensional logical framework (χ^2/df=1.93, CFI=0.95, RMSEA=0.06) all meet the ideal standards (χ^2/df<3, CFI>0.9, RMSEA<0.08)[17]. This confirms that the four dimensions of the teaching logic are closely connected and logically consistent, and the overall structure is stable, which can provide a clear and systematic guide for teaching practice.

5.2.3. Practical adaptability

The practical effect of the teaching logic is verified by the feedback from enterprises and the employment situation of students. Enterprise mentors from cross-border e-commerce, international trade, cross-cultural consulting and other fields have a 91.7% satisfaction rate with the students trained under this teaching logic. At the same time, 60% of the students in the experimental group have secured foreign-related jobs in diverse sectors. These practical results fully validate that the AI-Affective Integration Teaching logic is highly aligned with the multi-sectoral demands for foreign language talents, and has strong practical application value[4].

6. Conclusions

6.1. Research contributions

This study offers three key contributions. Theoretically, it constructs and validates an AI-enhanced teaching model integrated with affective mediation, expanding second language acquisition's (SLA) theoretical boundaries by synthesizing AI technology, social psychology, and multi-sectoral demands for foreign language talents.

Practically, it proposes a four-dimensional implementation framework transcending narrow sectoral limits, providing actionable guidance for universities to nurture composite foreign language talents adaptable to diverse international communication contexts. Methodologically, it employs a mixed method combining quasi-experiment and semi-structured interviews, with a diverse sample of majors and enterprise mentors, strengthening the research's reliability, validity, and universal applicability.

6.2. Limitations and future outlook

The sample of this study is confined to a single university in the GBA, constraining the generalizability of findings, and future research should expand sampling to other regions (e.g., the Yangtze River Delta) while incorporating universities with diverse disciplinary orientations. Additionally, the 16-week research duration means long-term impacts—such as graduates' cross-sectoral career development—warrant follow-up investigations. Furthermore, the model does not fully embrace emerging AI technologies like virtual reality (VR) emotional simulation, which could further enrich scenario-based practice.Future research directions: (1) Conduct cross-regional replications to test the model's generalizability across different educational contexts and regions; (2) Implement longitudinal studies to track graduates' career development for 3-5 years, evaluating the model's long-term impact on multi-sectoral employability; (3) Integrate VR and augmented reality (AR) technologies to optimize emotional simulation scenarios across diverse international contexts; (4) Explore the impact of individual differences (e.g., personality traits, learning styles) on the model's effectiveness, further refining the framework for personalized teaching.

Disclosure statement

The author declares no conflict of interest.

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