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EFL Motivation of College Engineering Students in China in the Era of AI

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Abstract

Based on Gardner's theory of L2 motivation and Dörnyei's L2 motivational self-system (L2 MSS model), this study, using the questionnaire survey method, investigates the English learning motivation of 76 freshmen majoring in engineering in China. The findings reveal that: (1) The English learning motivation of engineering students is dominated by instrumental motivation, with academic requirements (72.4%) and career development (68.4%) being the most prominent initial motivations; (2) Learning motivation shows a declining trend over time, with 63.2% of students reporting a decrease in enthusiasm, mainly attributed to the low relevance of course content to their major (average score 3.8/5) and the heavy workload of main courses (average score 4.1/5); (3) The use of AI tools shows the characteristic of "efficiency priority, efficacy in doubt", with 58% of students using AI to complete English homework weekly, but 64.5% believing that it has limited effect on improving language proficiency; (4) Students have a strong demand for teaching reform, especially expecting material related to their major (efficacy score 4.3/5) and personalized feedback (efficacy score 4.38/5). The research indicates that in the AI era, the EFL learning motivation of engineering students presents a complex situation of "strengthened instrumental rationality and weakened intrinsic motivation", which requires responses through curriculum integration, AI literacy cultivation, and the reconstruction of teacher-student relationships.

Keywords: EFL learning motivation, engineering students, artificial intelligence, instrumental motivation, college English teaching

1. Introduction

With the rapid advancement of generative artificial intelligence (Gen AI) technology, especially the increasing sophistication of large language models such as GPT-4 and GPT-5, and intelligent tools like DeepSeek, a fundamental transformation is taking place in the ecological environment of language learning (Li & Wu, 2025). In the realm of higher education, foreign language learning, particularly English learning, is confronted with unprecedented challenges and opportunities. Yang Lianrui (2024) noted that generative AI has exerted a profound influence on both the practice and theoretical research of foreign language learning.

For non-English major engineering students in China, English has long been regarded as a crucial instrument for accessing cutting-edge professional knowledge and engaging in international academic exchanges. However,

with Gen AI now capable of providing efficient and convenient translation and writing services, an urgent educational question arises: In an era where AI can offer such services, do engineering undergraduates still possess a strong intrinsic motivation to systematically learn and master English? Are the components of their learning motivation undergoing essential alterations?

This study zeroes in on the specific cohort of first-year engineering students in a second-tier engineering university in Jiangsu, China. Engineering freshmen are at a pivotal transitional period from basic English learning in high school to the application of academic English in university. Through preliminary classroom observations and informal teacher interviews, a prevalent phenomenon has emerged: At the commencement of the semester, freshmen typically exhibit a strong interest in College English, demonstrating high levels of classroom participation and enthusiasm for learning. Nevertheless, this positive state often proves short-lived. Approximately one month later, both the frequency of classroom interaction and students' learning engagement show a notable decline.

Does this phenomenon stem from a swift weakening of their English learning motivation? What are the specific types of their learning motivation (such as instrumental motivation, integrative motivation, etc.)? How do the intensity and persistence of these motivations impact their learning behaviors and academic performance? These questions form the core impetus of this study.

This research aims to delve into the following questions through empirical investigation, grounded in the educational landscape of the AI era and with first-year engineering students as the subjects of inquiry:

(1) What types of learning motivation primarily constitute the English learning motivation of first-year Chinese engineering students?

(2) Does their learning motivation undergo significant changes from the beginning of the semester to approximately one month later? If so, how?

(3) To what extent and in what ways does the popularization and application of Gen AI tools impact their English learning motivation?

2. Literature Review

2.1 Theoretical Framework of Second Language Learning Motivation

2.1.1 Classic Paradigms of Motivation Theory

Research on second language learning motivation traces its origins to the classic works of Gardner and Lambert. Gardner (1985), within the framework of his socio-educational model, clearly classified language learning motivation into two broad categories: "integrative motivation" and "instrumental motivation". Integrative motivation refers to learners' genuine interest in the culture and people of the target language community, accompanied by a desire to communicate with and integrate into it. In contrast, instrumental motivation is more utilitarian, oriented towards reaping practical benefits through language learning, such as passing exams, securing better jobs, or climbing career ladder. This dichotomy laid a solid foundation for subsequent decades of motivation research.

Subsequently, motivation theory has undergone continuous evolution and enrichment. Dörnyei (1994, 2005) extended Gardner's model, proposing a more dynamic and multidimensional "Second Language Motivational Self-System" (L2MSS). This system encompasses three dimensions: the Ideal L2 self, the Ought-to L2 Self, and L2 Learning Experience. It places greater emphasis on learners' projections of their future self-images and the influence of specific learning contexts on motivation. L2MSS model changed the way of understanding L2 learning's motivation by reinterpreting language learning motivation as "a form of self-development or self-realization" (Ryan & Dörnyei, 2013, p. 92).

In China, motivation theory has also been widely employed to explore English as a foreign language (EFL) learning. Gao Yihong et al. (2004) further introduced concepts such as "productive motivation", suggesting that the motivation of Chinese English learners may be multifaceted, dynamic, and subject to transformation. Zhang Hong and Du Xinran (2021) conducted a systematic study of college students' English learning motivation using the Q method and identified four primary types of motivation among them: future-oriented, failure-avoidant, self-developmental, and culturally interested. This classification has augmented the research paradigm of EFL motivation in the Chinese context, offering a novel perspective for comprehending the

complexity of students' learning motivation.

2.1.2 The Evolution of Motivation Theory in the Era of AI

In tandem with the changing landscape of second language learning, particularly the increasing penetration of technology, motivation theory has continued to develop. Ushioda (2011) suggested that in the context of globalization and the preeminence of English, traditional concepts like "integrative motivation" have lost some of their explanatory power to some extent. As English becomes an essential basic educational skill and the concept of a distinct target language community becomes less defined, second language motivation is being re-conceptualized from the vantage point of contemporary self and identity theory.

ElMajanini (2024)'s qualitative research underscored the key role of motivation in second language acquisition and highlighted the significant influence of classroom dynamics and teacher support on students' learning motivation. Bronfenbrenner's (1998) ecological systems theory suggests that teacher support, as an element within the micro-environment that directly impacts students' learning, is closely intertwined with their learning engagement.

2.2 Research on the Impact of AI Technology on L2 Learning Motivation

2.2.1 The Impetus of AI Technology on L2 Motivation

In recent years, research on the application of Gen AI in L2 learning has burgeoned. Jin et al. (2025) discovered through empirical research that the quality of students' academic writing improved and their writing motivation was strengthened after using Gen AI. Alrajhi et al. (2025) conducted a group-tracking study and found that, compared to online dictionaries, Google Assistant could significantly enhance students' L2 vocabulary acquisition. Shafiee Rad (2025) explored the facilitative effect of Gen AI on L2 reading comprehension. Huang & Mizumoto (2025) investigated the impact of using generative AI in EFL classrooms on the second language motivation self-system and found that the judicious use of AI tools could enhance students' ideal second language self and boost their learning motivation. Li & Wu (2025)'s systematic review of the use of generative AI tools in academic writing indicated that these tools could elevate writing quality, streamline writing processes, and cultivate self-regulated learning. These studies, from diverse perspectives, attest to the potential of Gen AI technology in enhancing the efficiency and effectiveness of second language learning.

2.2.2 The Potential Risks of AI Technology on L2 Motivation

Nonetheless, some scholars harbor reservations about the use of AI in L2 learning, criticizing its potential ethical implications, such as AI-assisted cheating. Zhang Hong and Du Xinran's (2021) research identified factors influencing English learning motivation, including teacher-related factors, learner characteristics, learning environment variables, family influences, and peer interactions. The intrusion of technology, they posited, may disrupt the equilibrium among these factors, thereby affecting learning motivation. Dang (2025)'s research directly confirmed this view. Dang found that after the implementation of AI in Vietnamese higher education classrooms, students not only became overly reliant on large language models but also demonstrated reduced critical thinking and collaborative skills during classroom activities.

Wu Heping and Wang Jing (2021) conducted a comprehensive review of three decades of research on instructed second language acquisition and identified that research on corrective feedback in classroom teaching and its specific manifestations (such as recasts, prompts, and questions) within the framework of cognitive psychology has been a focal point. This stands in interesting contrast to the automated feedback provided by AI technology, sparking inquiries into the potential disparities between AI and human teachers in providing feedback.

2.3 Research Gaps and Innovations

In summary, existing research in the intersection of AI technology and L2 learning motivation presents the following gaps:

(1) The majority of studies concentrate on the impact of AI on language learning outcomes, with relatively scant attention paid to its influence on learning motivation.

(2) There is little research targeting the specific group of engineering students, despite the fact that their English learning requirements differ significantly from those of non-engineering students.

(3) Empirical research on English learning

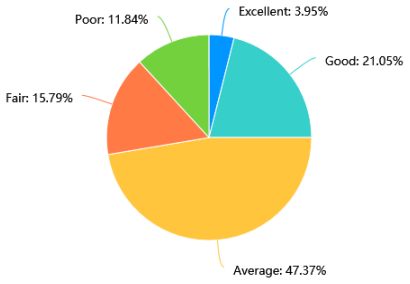
motivation as a foreign language in the AI era in China remains in its initial stage.

This study endeavors to address these research gaps by employing empirical investigation methods to explore the types, changes, and influencing factors of English learning motivation among engineering students in the AI era, thereby providing theoretical guidance and practical insights for related educational practices.

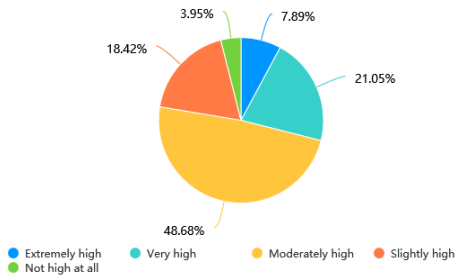
3. Research Design

3.1 Research Participants

This study utilized a questionnaire survey approach, targeting 76 first-year students from a second-tier engineering institution. Among them, 51.32% were male, 40.79% were female, and 7.89% did not disclose their gender information, indicating a relatively balanced gender distribution. As to their College Entrance Examination English scores, 56.58% of the participants scored within the range of 90 - 119, suggesting that the overall English proficiency of the sample was at a medium level. Additionally, 47.37% of the students self-assessed their English proficiency as "average" while 48.68% reporting moderate initial enthusiasm for learning College English, indicating a relatively rational distribution of representative samples.



Graph 1.



Graph 2.

3.2 Research Methods

This study adopts a mixed research approach with a quantitative focus and a qualitative supplement. Quantitative data was collected through a questionnaire survey to understand the basic situation, changing trends, and usage of AI tools of engineering students' English learning motivation. The questionnaire was designed based on Gardner's motivation theory framework and Zhang Hong's (2021) classification of motivation types, and was also combined with the usage of AI tools. The internal consistency reliability of the questionnaire, as measured by Cronbach's with α coefficient 0.87, indicating good reliability. Additionally, qualitative data was obtained through content analysis of the open-ended questions in the questionnaire survey, providing supplementary and explanatory information for the quantitative results, including students' suggestions for improving English teaching and other factors influencing their learning motivation.

3.3 Research Tools

This study utilized a self-designed "Engineering Students' College English Learning Motivation Questionnaire" based on Gardner's motivation theories. The questionnaire consists of the following sections:

(1) Basic information, including gender, college entrance examination English scores, self-assessed English proficiency, etc.;

(2) Measurement of learning motivation, including initial motivation types and changes in motivation intensity;

(3) Usage of AI tools, including frequency of use, reasons for use, and perception of the effectiveness of AI tools;

(4) Teaching preferences, including evaluations of the effectiveness of different teaching methods and the importance of teachers' qualities;

(5) Open-ended questions, including suggestions for improving English teaching and other factors influencing learning motivation.

3.4 Data Collection and Analysis

The questionnaire was compiled and distributed through the Wenjuanxing platform, and a total of 76 valid questionnaires were collected. Quantitative data was processed using SPSS 25.0 for descriptive statistics and correlation analysis,

etc. Qualitative data from the open-ended questions was analyzed by NVivo 12 through a three-level coding process of open coding, axial coding, and selective coding to extract core categories and relationships.

4. Research Results and Findings

4.1 Types and Intensity of Engineering Students' English Learning Motivation

The survey shows that the English learning motivation of engineering freshmen is clearly oriented towards instrumental purposes. Among the initial motivations, academic requirements (56.58%) and preparation for CET-4/6 exams (67.11%) ranked first and second, indicating that institutional and certification pressures dominate students' initial motivations. This is consistent with Gardner's (1985) instrumental motivation theory and also confirms the "self-development" motivation characteristics in Zhang Hong and Du Xinran's (2021) classification.

Table 1. Distribution of the Initial EFL learning Motivation Variables (Multiselect, N=76)

Motivation variables	Percentage	Typical Expression
Academic demand	56.58%	"pass the tests"; "graduation precondition"
CET-4/6	67.11%	"required to pass Cet4"; "for more job opportunities"
Career Prospect	68.42%	"foreign companies"; "read technical files"
Cultural Interest	23.68%	"be attracted to American and English culture"; "watch English TV series"
Others	5.26%	"pressure from parents"; "peer influence"

Further analysis reveals that the instrumental motivation of engineering students is characterized by a distinct pragmatism. In responses to open-ended questions, some students stated, "If AI translation is accurate enough, why spend so much time learning English? Unless it's for professional reading or going abroad." This statement reflects the utilitarian assessment of the value of English learning by students in the AI era, which is consistent with Ushioda's (2011) observation that English has become a "necessary skill" in a globalized context.

It is worth noting that although instrumental motivation is dominant, students' emotional attitudes towards English learning are not entirely negative. 42.11% of the students consider the current English learning atmosphere "neutral", and 36.84% think it is "relatively positive". This indicates that engineering students still maintain a basic emotional acceptance of English learning, providing a possible space for teaching intervention.

4.2 Dynamic Changes in Engineering Students' English Learning Motivation

The survey on changes in learning motivation shows that the English learning motivation of engineering students significantly declines over time since enrollment. 56.58% of the students reported that their enthusiasm for learning "has not changed", but the analysis of open-ended questions suggests that this "stability" more reflects a lack of enthusiasm for English learning rather than sustained passion.

Table 2. Engineering student's EFL Motivation Change and Reasons (N=76)

Change types	Percentage	Main reasons
increase	15.79%	"the teacher is interesting"; "content is practical"
Unchanged	56.58%	"nothing"; "the same as before"
decline	27.63%	"excessive burden of major courses"; "low relevance of course content to the major"

Among the factors that lead to a decline in learning enthusiasm, "excessive burden of major courses" (with an agreement rate of 3.11/5) and "low relevance of course content to the major" (with an agreement rate of 3.8/5) stand out the most. One student wrote in an open-ended

question: "There are always lab reports to write every week, and programming assignments as well. I really can't spare time to study English seriously and can only deal with it a little." This reflects the unique predicament faced by engineering students — the academic pressure from major courses has a significant "crowding-out effect" on English learning. This finding echoes Dörnyei's (2005) theory of the L2 motivation self-system. There is a clear gap between the "ought-to self" (such as passing exams and meeting graduation requirements) and the "ideal self" (such as becoming an international engineer) of engineering students, and the heavy workload of major courses further undermines the quality of the second language learning experience, leading to an overall imbalance in the motivation system.

4.3 The Relationship Between AI Tool Usage and English Learning Motivation of Engineering Students

4.3.1 Overview of AI Tool Usage

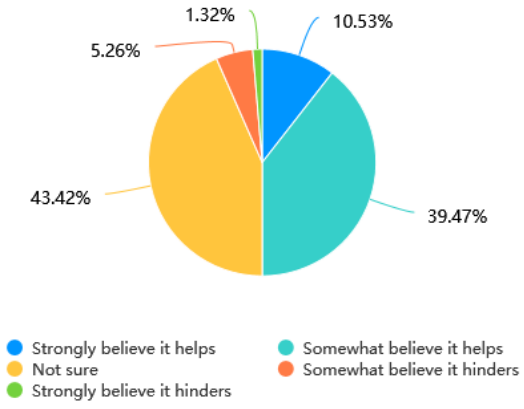
The survey shows that AI tools have become widespread in the English learning of engineering students. 58% of the students use AI tools to complete English homework every week, and 34.21% use them 1-2 times a month. Regarding the reasons for usage, 81.6% of the students choose "saving time", and 53.95% choose "improving the quality of homework", indicating that students mainly view the value of AI tools from the perspective of efficiency.

Table 3. AI Use Frequency and major Cause (N=76)

Frequency	Percentage	Major cause
everyday	11.84%	"to finish homework quickly"; "error checking"
1-2times/week	46.05%	"improve writing quality"; "save time"
1-2times/month	34.21%	"difficult problems"; "sometimes"
rarely	7.89%	"afraid of dependence"; "not allowed by the teacher"

4.3.2 Evaluation of the Effectiveness of AI Tools

Despite the frequent use of AI tools, students' assessment of their actual effectiveness tends to be conservative. 64.5% of the students believe that AI tools have a "limited" effect on improving their actual English proficiency, and 43.42% are "uncertain" whether AI has truly enhanced their English skills. This paradoxical phenomenon of "high usage rate but low sense of effectiveness" reveals the double-edged sword effect of AI tools in English learning.



Graph 3.

On the one hand, AI tools have indeed improved learning efficiency or work quality. As one student put it, "Using ChatGPT to revise my essay, I can get a text with perfect grammar and natural expression in an instant, which is much better than my own efforts for hours."

On the other hand, over-reliance on AI has brought potential risks to the development of abilities. Another student admitted, "Now whenever I encounter English writing, I habitually turn to AI, and I feel that my own expression ability has declined." This result echoes Dang (2025)'s finding that long-term use of AI tools may lead to a decline in students' critical thinking and collaborative abilities. At the same time, it also confirms the view in Li & Wu (2025)'s systematic review that while AI tools can improve writing efficiency, they may have a negative impact on the development of students' critical thinking and independent writing abilities.

4.4 Engineering Students' Expectations for English Teaching Reform

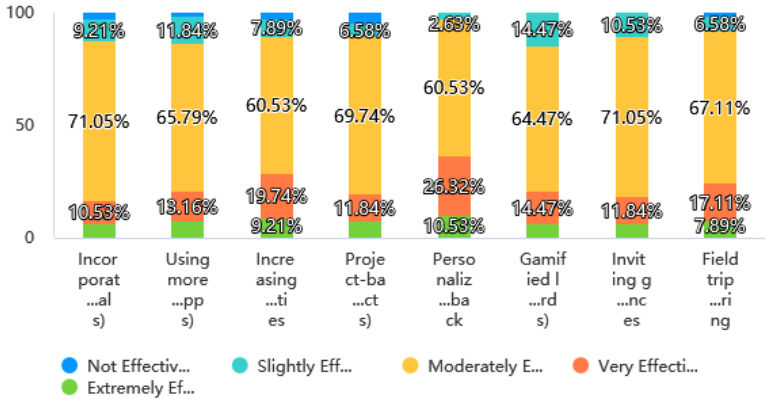
Facing the dual challenges of motivation decline and the impact of AI, engineering students have clear expectations for English teaching reform.

In the evaluation of the most effective teaching methods, "professional-related materials" (efficacy score 4.3/5) and "personalized feedback" (efficacy score 4.38/5) ranked first and second, while "gamification learning elements" (efficacy score 2.89/5) received the lowest evaluation.

Table 4. Efficacy Evaluation of Different Teaching Methods (1 = Completely ineffective, 5 = Extremely effective)

Teaching methods	Average score	Standard Deviation
Personalized feedback	4.38	0.72
professional-related materials	4.30	0.68
Inter-active study	4.10	0.75
Project-based learning	3.85	0.81
Gamification learning elements	2.89	0.92

In terms of teacher qualities, "approachable and supportive attitudes" (67.11%) and "the ability to integrate English application with professional background" (76.3%) are most valued by students, surpassing traditional evaluation indicators such as "proficient in professional knowledge" (42.1%). This reflects students' high expectations for teacher-student relationships and the practicality of teaching content. These findings are consistent with ElMajanini's (2024) qualitative research results, which indicate that teachers' emotional support and the appropriateness of teaching contexts are key factors in maintaining second language learning motivation. At the same time, they also confirm the viewpoint of Wu Heping and Wang Jing (2021) that second language classroom teaching should pay more attention to learners' cognitive mechanisms and emotional needs.



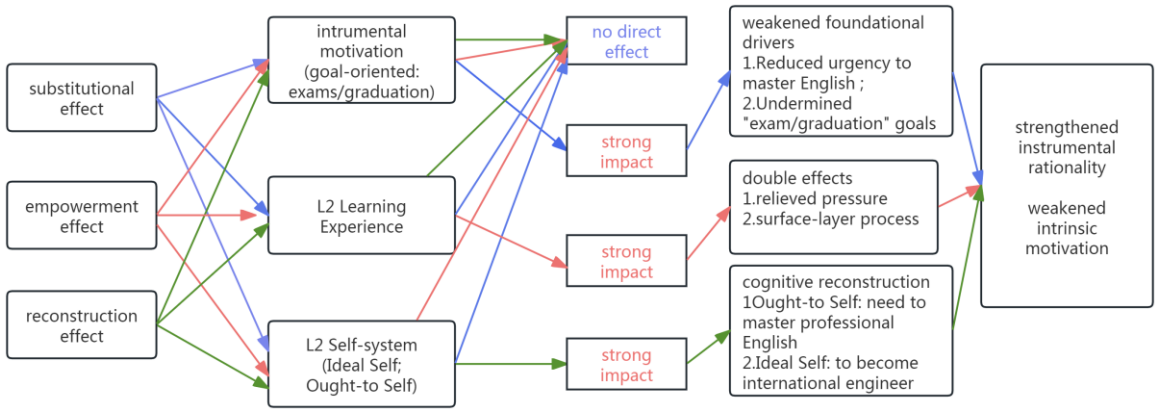
Graph 4.

5. Discussion

5.1 The Development Mechanism of EFL Motivation for Chinese Engineering Students in the AI Era

Based on the survey results, this study constructs a model of the development mechanism of EFL motivation for engineering students in the AI era (see Graph 5). In this model, AI technology, as a key environmental variable, influences engineering students' English learning motivation through three paths: the first is the substitution effect, where the possibility of AI tools substituting for traditional English abilities reduces the urgency of learning English; the second is the empowerment effect, where AI tools enhance the efficiency of English learning and to some extent alleviate learning pressure; the third is the reconstruction effect, where AI technology changes the value structure of English abilities,

making high-level language application abilities (such as technical communication and professional writing) more prominent.



Graph 5. (The Development Mechanism of EFL Motivation for Chinese Engineering Students in the AI Era)

Under this mechanism, the English learning motivation of engineering students presents a complex situation of "strengthened instrumental rationality and weakened intrinsic motivation". On the one hand, in the face of the substitution threat from AI technology, students more rationally assess the input-output ratio of English learning and tend to concentrate their limited learning resources on the most practical areas. On the other hand, the efficiency of AI tools reduces the need for students to deeply engage in the language learning process, thereby reducing the opportunities for the generation of intrinsic motivation. This mechanism can be interpreted from two theoretical perspectives: from Gardner's (1985) motivation theory, AI technology strengthens the utilitarian orientation of instrumental motivation while weakening the cultural interest dimension of integrative motivation; from Dörnyei's (2005) L2 Motivational Self System, AI technology may both enhance the "Ought-to L2 Self" (such as passing exams with AI assistance) and weaken the attractiveness of the "Ideal L2 Self" (such as becoming a proficient English user).

5.2 Implications for College English Teaching

5.2.1 Curriculum Content Reconstruction: Shift from General English to Professional English

The survey results show that engineering students have a strong preference for professional-related English materials (efficiency score 4.3/5), providing a clear direction for the reform of college English teaching. Traditional general English courses are difficult to meet the learning needs of engineering students in the AI era, and there is an urgent need to shift to English teaching based on professional contexts.

Specifically, College English teaching can be adjusted as follows: First, introduce authentic engineering materials such as technical documents, academic papers, and project reports to deeply integrate language learning with professional content; second, carry out project-based language learning, allowing students to develop language skills in professional projects mediated by English, such as writing English project proposals and giving technical presentations; third, strengthen academic English skills, focusing on cultivating students' reading, writing, and communication abilities in professional fields to enhance their English application skills in academic and professional scenarios. This curriculum reconstruction not only echoes the view of Wu Heping and Wang Jing (2021) that second language classroom teaching should pay more attention to the authenticity of language but also aligns with the concept of "contextualized language learning" proposed by ElMajanini (2024).

5.2.2 Integration of AI Literacy: Shift from Tool Use to Capability Development

In the face of the widespread use of AI tools, a simple ban is neither realistic nor wise. Instead, College English teaching should proactively integrate AI literacy education, guiding students

to shift from superficial tool use to in-depth capability development.

First, carry out metacognitive training for AI-assisted learning to help students clarify the appropriate role of AI in English learning, such as being a writing assistant rather than a writer, and a creativity stimulator rather than a substitute for thinking; second, design human-machine collaborative learning tasks, such as comparing the differences between AI and human translations, analyzing the language features of AI-generated texts, etc., to cultivate students' critical AI usage skills; third, establish academic norms for AI use, clearly defining the ethical boundaries of AI-assisted learning to prevent academic misconduct. These measures are consistent with the "responsible AI use" principle proposed by Li & Wu (2025) and also help address the problem of excessive reliance on AI pointed out by Dang (2025).

5.2.3 Reshaping the Teacher-Students Relationship: Expansion from Knowledge Transmission to Emotional Support

In the survey, "approachable and supportive attitude" (67.11%) was regarded by students as the most important teacher quality, suggesting that in the AI era, the role of teachers needs to expand from traditional knowledge transmitters to emotional supporters of learning.

First, strengthen personalized feedback, providing targeted guidance based on students' specific learning difficulties and needs to make up for the mechanical nature and lack of contextual understanding of AI feedback; Second, it is to build a learning community, through group cooperation, peer evaluation and other methods, to create a positive learning atmosphere and counteract the possible sense of isolation brought by AI learning; third, it is to pay attention to the dynamic changes in learning motivation, promptly identify signs of motivation decline among students, and respond through teaching intervention. These measures reflect Bronfenbrenner's (1998) ecosystem theory's view that teacher support is a key element in the micro-environment, and also echo ElMajanini's (2024) finding on the importance of teacher emotional support for second language learning motivation.

5.3 Theoretical Reflection and Innovation

This study makes three contributions to the development of EFL motivation theory in the AI era: Firstly, the study proposes the hypothesis of "strengthening of instrumental rationality and weakening of intrinsic motivation" in the evolution of motivation in the AI era, enriching the theoretical understanding of the mechanism of L2 learning motivation changes in a technological environment. This hypothesis takes into account both the substitution effect of AI technology and its empowering potential, providing a theoretical framework for understanding the complex relationship between AI and EFL learning motivation.

Secondly, the study reveals the particularity of EFL learning motivation among Chinese engineering students, namely the "crowding-out effect" between the academic pressure of major courses and English learning, as well as the interactive influence between professional identity and English learning motivation. This finding expands the application of second language learning motivation theory to specific learner groups and provides a theoretical basis for targeted teaching intervention.

Finally, the study constructs a dynamic model of the second language motivation self-system in the AI era, revealing how AI technology reconstructs students' motivation structure through influencing the dimensions of Ideal L2 Self, Ought-to L2 Self, and L2 Learning Experience. This model provides a testable theoretical framework for subsequent research and theoretical guidance for teaching practice.

6. Conclusions and Suggestions

6.1 Research Conclusions

This study, through questionnaire surveys and qualitative analysis, explored the types, changes, and influencing factors of English learning motivation among Chinese engineering students in the AI era, and reached the following main conclusions:

First, the English learning motivation of Chinese college engineering students is dominated by instrumental motivation, with academic requirements and career development being the most prominent in the initial motivation, showing a clear pragmatism orientation. This motivation structure forms a complex interaction with the substitution possibilities provided by AI technology.

Second, the English learning motivation of engineering students shows a declining trend with the length of time at school, with excessive burden of major courses and low relevance of

course content to the major being the main reasons for the decline in motivation. This motivation decline reflects the special academic pressure faced by engineering students and also reveals the disconnection between current College English courses and professional needs.

Third, the popularity of AI tools in the English learning of engineering students is high, but students' evaluations of their actual effects tend to be conservative, presenting a contradictory phenomenon of "high usage rate and low sense of efficacy". This contradiction not only reflects the actual limitations of AI tools but also reveals the superficial characteristics of students' usage methods.

Fourth, engineering students have clear expectations for English teaching reform, particularly emphasizing the importance of profession-related content and personalized feedback, while also highly valuing the role of teachers' emotional support. These expectations provide directional guidance for College English teaching reform in China in the era of AI.

6.2 Teaching Improvement Suggestions

Based on the research findings, the following teaching improvement suggestions are proposed:

In terms of curriculum integration: Develop an engineering English module, integrating professional tasks such as technical document reading and project report writing into College English teaching class; establish interdisciplinary projects, such as "Engineering Innovation English Workshop", to achieve a deep integration of English learning and professional application.

As for AI application: Formulate an AI usage guideline, clearly defining the appropriate role and usage boundaries of AI tools in each learning stage; offer AI-assisted learning workshops to demonstrate how to use AI for brainstorming, outline drafting, and text revision, while maintaining academic integrity. In other words, devise proper supervising tasks to help students turn AI tools into customized personal AI tutors.

In terms of assessment reform: Establish a multidimensional assessment system, combining technical document translation (35%), collaborative presentation (25%), and academic writing (40%), to comprehensively evaluate students' English application abilities.

Teacher development: Implement teacher development programs, focusing on training personalized feedback skills based on AI tools; establish a teacher-student learning community to jointly explore English learning paths in the AI era through regular exchanges; delve into personal interests and difficulties of students through classroom observation and surveys, establishing emotional connections and support.

6.3 Research Limitations and Future Directions

This study has the following limitations: Firstly, the sample size is limited and comes from a single school, and the general applicability of the results needs further verification; secondly, the study mainly adopts a cross-sectional design, making it difficult to capture the dynamic process of motivation changes; finally, the measurement of AI tool usage is relatively macroscopic and fails to distinguish the possible differences among different types of AI tools. Future research can be conducted in the following aspects: First, carry out long-term follow-up studies to examine the long-term evolving trajectory of engineering students' English learning motivation; second, expand the sample range to include engineering students from different levels and types of universities to enhance the diversity of the samples and representativeness of the results; third, deeply explore the differentiated impacts of different types of AI tools on second language learning motivation; fourth, conduct teaching intervention studies to test the actual effects of different teaching strategies on maintaining and enhancing engineering students' English learning motivation.

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