

Construction of Generative-AI-Enabled Educational Pathways for Extracurricular Foreign Language Learning Under Ideological and Political Guidance: An Exploration of the “Student-AI-Teacher” Tripartite Collaborative Model in Discontinuous-Data Scenarios

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Abstract: Against the backdrop of the in-depth integration of the digital transformation of education and curriculum-based ideological and political education, College English teaching remains plagued by such challenges as students' inadequate lexical competence, the lack of personalized learning resources, and insufficient motivation for autonomous learning. Meanwhile, existing AI-empowered educational research has paid markedly insufficient attention to the scenario of discontinuous after-class learning data. In view of this, this study takes 21 non-English major undergraduates enrolled in 2023 from Guangdong University of Foreign Studies South China Business College as the research sample, and constructs a tripartite collaborative model of “student-led autonomous generation, AI-enabled precise empowerment, and teacher-targeted guidance” through an 8-week teaching experiment. A mixed analytical framework integrating frequency-weighted analysis, individual longitudinal tracking, and extraction of common issues is adopted for empirical verification and in-depth exploration. The results indicate that the proposed model can significantly improve students' cloze problem-solving competence, lexical application competence, and autonomous learning awareness, and “4 effective practice sessions” is identified as the critical threshold for its synergistic effect. Meanwhile, this study reveals the behavioral characteristics of students' autonomous learning and the potential risks of AI application in the context of discontinuous data, and establishes a full-process integration path for curriculum-based ideological and political education. This research not only provides a replicable paradigm for after-class College English teaching in application-oriented undergraduate institutions, but also points out a clear direction for the coordinated development of technology and value in foreign language teaching in the AI era.

Keywords: generative AI; college English; autonomous learning; curriculum-based ideological and political education; after-class teaching

1. Introduction

Driven by dual policy initiatives of “advancing digital transformation of education” and “promoting innovative foreign-language teaching empowered by new technologies” [1, 2], College English teaching is

urgently required to shift from simple technological superposition to in-depth “collaboration between technology and value”. As an application-oriented undergraduate institution, Guangdong University of Foreign Studies South China Business College (hereinafter referred to as GDUFS-SBC) sets its core goal of English teaching on cultivating students’ practical language application competence. Nevertheless, practical teaching reveals multiple prominent dilemmas. First, constrained by mechanical rote memorization, many students fail to cope with authentic discourse contexts even after mastering core textbook vocabulary, which results in persistently low accuracy rates in exercises. Second, resource allocation remains at a crude “one-size-fits-all” stage: unified exercise sets intimidate under-achieving students while failing to satisfy high-achieving learners. Third, students generally lack awareness of autonomous learning planning, and superficial learning behaviors such as passively completing assigned homework are commonplace.

Existing studies have confirmed that artificial intelligence can enhance students’ interdisciplinary problem-solving competence and real-world problem-solving capacity [3,4], and 5G and cloud computing contribute to improving multiple skills in students’ English learning [5]. Generative-AI tools (e.g., Doubao, DeepSeek) open new possibilities for addressing the pedagogical dilemmas at GDUFS-SBC. Generative AI can produce personalized discourses to realize on-demand practice and contextualized learning, substantially lowering barriers to accessing learning resources. However, current studies on AI-empowered foreign-language teaching suffer from two major limitations: insufficient motivation for student autonomous learning [6] and poor scenario adaptability. Most existing research focuses on in-class teaching [7–9], while seldom exploring authentic after-class conditions featured by uneven student submission frequency and discontinuous data, which leads to disconnection between research conclusions and real-world teaching scenarios.

The concept of Autonomous Learning (also known as Self-regulated Learning) originates from humanistic educational theories. It refers to learners’ capacity to determine learning strategies and dynamically adjust learning procedures based on learning outcomes [10]. Learning is not a linear process of knowledge transmission from teachers to students, but a dynamic process in which learners actively construct knowledge meaning. Teachers play a supportive and guiding role for autonomous learning rather than replacing students as cognitive subjects. Domestic research further emphasizes the correlation between autonomous learning and learning efficiency as well as innovative-thinking development [11], in contrast to overseas conceptualizations that define autonomous learning as learners’ control over their own learning processes. The after-class learning model constructed in this study is highly consistent with core connotations of autonomous-learning theories: students take full charge of learning procedures by selecting target vocabulary, setting exercise difficulty and generating and completing exercises; generative-AI tools supply personalized learning resources; teachers offer scaffolding support through targeted feedback and Q & A.

The theory of instrumental-rationality and value-rationality balance defines instrumental rationality as pursuit of predefined goals via optimal means (efficiency-oriented), and value rationality as focus on intrinsic behavioral values and all-round human development [12]. Dynamic balance between the two constitutes a core proposition for educational-technology application. In AI-empowered foreign-language education practice, foreign-language disciplines should cultivate students’ positive qualities, facilitate their social adaptation and realize comprehensive educational values [13]. This study adheres to the principle of “value rationality prioritized, with instrumental rationality serving value rationality”. Clear boundaries are established in practical implementation: the instrumental strengths of AI are leveraged to improve after-class learning efficiency and expand personalized resource banks; meanwhile, the educational essence of talent cultivation is prioritized, with curriculum-based ideological-political education embedded in every link of autonomous learning. This research attaches importance to simultaneous development of students’ autonomous-learning competence, critical thinking and positive values, so as to achieve substantive integration between technology and humanistic education. Specifically, standardized AI-tool application helps foster academic integrity and critical thinking; model construction strengthens autonomous-planning awareness and lifelong-learning responsibility, so as to realize deep integration of value guidance and competence cultivation.

Against the above-mentioned research background and practical dilemmas, this study aims to break the traditional classroom-centered paradigm, tackle after-class teaching challenges, and provide evidence for

universities to implement digital educational transformation and curriculum-based ideological-political education. Four core research questions are put forward:

- (1) How can a rigorous analytical framework adapted to discontinuous-data scenarios be constructed to guarantee reliability and persuasiveness of research findings?
- (2) Under discontinuous-data scenarios, can the “student-led autonomous generation, AI-enabled precise empowerment and teacher-targeted guidance” tripartite model significantly improve students’ cloze problem-solving competence and lexical application competence?
- (3) What behavioral characteristics and potential risks of student autonomous learning can be identified from discontinuous data, and what corresponding optimization strategies can be formulated?
- (4) How can effective integration pathways for curriculum-based ideological-political education be designed in AI-empowered after-class autonomous College-English learning?

2. Research Design

The initial research participants consist of 29 third-year undergraduates majoring in Spanish (class of 2023) from Guangdong University of Foreign Studies South China Business College. The participants demonstrate heterogeneous proficiency levels, ranging from CET-6 pass holders to learners with weak word-recognition competence. The teaching experiment lasts eight weeks, from 13 October to 11 December 2025. Samples are deemed invalid if any of the following conditions occur: missing key information (accuracy rates, target learning vocabulary, feedback content) exceeds three items; failure to generate exercises containing designated target vocabulary; logically disordered practice behaviors (e.g., erratic switching of exercise difficulty levels). Finally, 21 valid samples are retained, with practice-frequency distribution as follows: 3 participants for one practice session, 5 for two sessions, 4 for three sessions, 3 for four sessions, 2 for five sessions, and one participant respectively for six, seven, eight and eleven sessions. All valid samples satisfy criteria of logical practice behaviors, complete key data and compliance with exercise-generation requirements. The valid-data recovery rate reaches 72.4%.

This study integrates complementary strengths of quantitative and qualitative research and implements an eight-week after-class autonomous-learning experiment. Students generate personalized cloze exercises via generative-AI tools and finish relevant exercises, and teachers deliver targeted responses based on submitted feedback. Model effectiveness is evaluated by analyzing exercise accuracy rates, completion time and vocabulary-mastery status collected across eight weeks. To address discontinuous-data challenges caused by uneven student submission frequency, quantitative indicators including accuracy rates, completion time and vocabulary-mastery levels are weighted by practice frequency (e.g., individual weighted accuracy = Σ (single-session accuracy $\times$ 1/total practice frequency)), eliminating interference of variable practice frequencies on group-level statistics. Individual longitudinal tracking is adopted to analyze dynamic behavioral characteristics of each participant’s learning procedures (vocabulary selection, difficulty adjustment, accuracy fluctuation), compensating limitations of cross-sectional statistics. Extraction of common-problem patterns further mitigates biases stemming from heterogeneous submission frequency, achieving multi-dimensional evaluation of teaching-experiment outcomes. Core data sources include feedback recorded in online Excel learning forms and targeted teacher responses, supplemented by informal student interviews. These materials are adopted to analyze students’ perceptions, experiences, gains and challenges regarding AI-empowered learning and clarify practical pathways for role positioning of teachers and students.

Students, artificial-intelligence systems and human teachers can jointly form a learning community where each party gives full play to its strengths [14]. This study establishes the tripartite experimental model of “student-led autonomous generation, AI-enabled precise empowerment and teacher-targeted guidance”. Its workflow is elaborated below:

As subjects of learning, students select generative-AI platforms including Doubao, DeepSeek, Tencent Yuanbao, ChatGPT and Kimi. They choose 5–10 target vocabulary items per week from core unit words of “*New Horizon College English Reading and Writing (4th Edition), Volume III*” (e.g., constrained, transcend, ambiguity), CET-4 high-frequency vocabulary or self-selected interest-based words. Guided by provided prompt

templates (e. g., “Generate a medium-difficulty CET-4 cloze exercise with target words cluster, globalize, decidedly, offset, cognitive; set the discourse theme as environmental protection, and ensure each target word is used exactly once”), students specify exercise difficulty, target vocabulary and discourse themes to independently generate exercises. Afterwards, students complete AI-generated exercises, conduct self-grading against reference answers, mark wrong-question puzzles, and fill in online Excel record forms with accuracy rates, completion time, vocabulary-mastery status and personal feedback or questions for weekly submission.

Teachers act as facilitators undertaking three-fold responsibilities. At the experimental preparation stage, teachers design online Excel learning-record forms (see Table 1), provide standardized prompt templates and AI-application guidelines to help students articulate clear requirements and ensure generated exercises align with learning objectives. During the experiment, teachers respond to puzzles submitted in Excel forms (e.g., lexical distinctions, complex-sentence comprehension and problem-solving confusion) with in-depth targeted explanations. Teachers regularly review learning records, analyze progress and common-problem patterns, and share learning skills (vocabulary memorization, problem-solving strategies and prompt optimization) in class to guide students to refine learning approaches and strengthen autonomous-planning capacities.

Table 1. Online Excel Learning-record Form.

Student Name	Student ID	Practice Date	AI Tool Adopted	AI-Generated Exercise Type	Exercise Difficulty	Target Learning Vocabulary	Accuracy Rate	Completion Time	Mastery Level [15]	Student Feedback/ Questions	Teacher Feedback
	1	xxxx.xx. xx		Cloze Test	Medium	Comicfietion	... %				

Prompt reference: Generate a hard/medium/easy-level CET-4 cloze exercise on theme of ...; candidate answers are comic, fiction, stack ...; each candidate word shall be used exactly once. Mastery-level options: (1) No comprehension: totally unfamiliar with word meaning and usage; (2) Partial confusion: vague understanding of word meaning and usage; (3) Basic comprehension: grasp core denotation yet struggle with contextual application; (4) Comprehension in most contexts: understand and correctly use words in common scenarios; (5) Comprehension and application across diverse contexts: understand and flexibly deploy words in varied situations; (6) Proficient sentence-making and application: freely use target words in spoken and written production.

3. Quantitative Research Results and Analysis

Frequency-weighted computation is applied to quantitative data from 21 valid samples to eliminate influences of unequal practice frequency on group-level analysis. Results are presented in Table 2.

Except for the idiosyncratic fluctuation of the seven-session group, practice frequency is generally positively correlated with weighted average accuracy rates. The four-session group (92.50%) achieves a 25.5% improvement compared with the one-session group (67.00%). The five-session (81.70%), six-session (87.50%) and eleven-session (85.00%) groups all maintain accuracy above 80%, and high-frequency groups (≥ 4 sessions) exhibit smaller performance fluctuations (standard deviations mostly below 15). This demonstrates that higher practice frequency contributes to greater stability in problem-solving competence. Four practice sessions constitute a critical threshold for accuracy improvement: accuracy rises by 16.25% from the three-session group to the four-session group. None of the three participants in the four-session group produce extremely low single-session accuracy (e.g., 0%), with individual performance ranging from 60% to 100%. The one-session group suffers from low accuracy and high volatility (standard deviation = 17.55) due to insufficient practice volume. Progressive accuracy growth with increasing practice frequency verifies that the tripartite collaborative model improves cloze-test problem-solving competence.

Table 2. Distribution of Weighted Accuracy Rates across Groups with Different Practice Frequencies.

Practice Frequency	Number of Participants	Weighted Average Accuracy Rate (%)	Range of Single-Session Accuracy (%)	Standard Deviation
1 session	3	67.00	50.00-85.00	17.55
2 sessions	5	73.50	40.00-100.00	18.03
3 sessions	4	76.25	0.00-100.00	32.79
4 sessions	3	92.50	60.00-100.00	13.23
5 sessions	2	81.70	67.00-90.00	8.58
6 sessions	1	87.50	85.00-90.00	2.04
7 sessions	1	57.14	50.00-80.00	10.69
8 sessions	1	78.13	45.00-90.00	14.58
11 sessions	1	85.00	80.00-95.00	4.84
Overall	21	78.36	0.00-100.00	15.62

As shown in Table 3, participants in one-session and two-session groups mostly select easy-to-medium difficulty, which explains their relatively short weighted completion time (6.67–8.40 min). The three-session group records the longest duration (11.92 min), as participants attempt medium-difficulty exercises and adapt to discourse logics of AI-generated items. Completion time drops to 7.67 min in the four-session group after participants master problem-solving skills. The five-session group yields the maximum average duration (14.10 min), partly attributable to individual cases with 20-minute single-session consumption (repeated vocabulary consultation) or inherently slow reading speed among low-proficiency learners. This indicates that low-level learners require more practice sessions to boost efficiency, calling for further individual-differentiation optimization (e.g., simplified discourse templates for under-achieving students). The overall weighted average completion time stands at 10.28 min, nearly matching the official CET-4 cloze-test time suggestion of 10 min. The one-session, two-session and four-session groups finish exercises within the suggested time limit. AI-generated personalized exercises reduce redundant reading irrelevant to target vocabulary, and problem-solving strategies imparted by teachers (e.g., identifying logical connectives) further cut down reasoning time, aligning learner efficiency with test-taking requirements.

Table 3. Distribution of Weighted Completion Time across Groups with Different Practice Frequencies.

Practice Frequency	Weighted Average Completion Time (Minutes)	Range of Single-Session Completion Time (Minutes)	Standard Deviation	Deviation from CET-4 Suggested Time Limit (10 min)
1 session	6.67	6.00–8.00	1.15	–3.33 min
2 sessions	8.40	6.00–10.00	1.84	–1.60 min
3 sessions	11.92	8.00–15.00	2.53	+1.92 min
4 sessions	7.67	4.00–20.00	6.51	–2.33 min
5 sessions	14.10	8.00–20.00	4.95	+4.10 min
6 sessions	10.83	8.00–13.00	2.07	+0.83 min
7 sessions	12.29	12.00–14.00	0.82	+2.29 min
8 sessions	11.63	10.00–18.00	2.74	+1.63 min
11 sessions	10.82	9.00–15.00	1.87	+0.82 min
Overall	10.28	4.00–20.00	3.86	+0.28 min

Table 4 reveals that the one-session group obtains the lowest weighted average mastery level (2.33). A single practice session cannot consolidate contextual memory, and 33.33% of records fall into Level 1. The two-session group rises to 3.60, with 30% of records reaching Level 5 via contextual practice. A substantial jump occurs for the four-session group (weighted mastery = 4.42), confirming four sessions as the key threshold for lexical-application improvement. Nevertheless, individual records show regression from Level 3 to Level 1 even with high practice frequency, implying that vocabulary advancement can be restrained without targeted teacher guidance. The overall weighted mastery level is 3.26, falling between “basic comprehension” and “comprehension in most contexts”. As many as 58.34% of single-session records in the four-session group achieve Level 5. Some participants report that they can flexibly deploy words such as *transcend*. These findings validate the contextual-learning effect of the tripartite collaborative model: AI-generated cloze-test discourses facilitate understanding of lexical collocations, while teacher-delivered lexical-distinction instruction breaks through application bottlenecks.

Table 4. Weighted Distribution of Students’ Vocabulary-mastery Levels.

Practice Frequency	Weighted Average Mastery Level	Range of Single-Session Mastery Level	Ratio Level 1 (No Comprehension) (%)	Ratio Level 2 (Partial Confusion) (%)	Ratio Level 3 (Basic Comprehension) (%)	Ratio Level 4 (Comprehension in Most Contexts) (%)	Ratio Level 5 (Flexible Application) (%)
1 session	2.33	1.00-4.00	33.33	33.33	0.00	33.33	0.00
2 sessions	3.60	2.00-5.00	0.00	10.00	20.00	40.00	30.00
3 sessions	2.92	0.00-5.00	8.33	16.67	50.00	0.00	25.00
4 sessions	4.42	2.00-5.00	0.00	8.33	8.33	25.00	58.34
5 sessions	2.80	2.00-4.00	0.00	40.00	50.00	10.00	0.00
6 sessions	4.00	4.00-4.00	0.00	0.00	0.00	100.00	0.00
7 sessions	3.86	3.00-4.00	0.00	0.00	14.29	85.71	0.00
8 sessions	2.75	1.00-3.00	12.50	0.00	87.50	0.00	0.00
11 sessions	3.00	2.00-4.00	0.00	18.18	63.64	18.18	0.00
Overall	3.26	0.00-5.00	7.84	17.65	39.22	25.49	9.80

Participants in one-session and two-session groups choose easy-or-medium difficulty at early stages as they get acquainted with AI tools and exercise logics. Medium-difficulty exercises become predominant from the third session onward, balancing lexical practice and competence development. Medium-difficulty selections account for 79.92% of total selections, indicating students can rationally match difficulty to their actual proficiency (“challenging yet attainable”). Teachers’ guidance on difficulty adjustment helps learners avoid demotivation caused by overly hard exercises and inefficient practice from overly simple items. Hard-or-very-hard exercises are only adopted by participants completing five or more sessions. Participants report attempting higher-difficulty items after stabilizing accuracy, which demonstrates enhanced self-confidence and autonomous-learning awareness fostered by the tripartite model (see Table 5).

To remedy limitations of aggregate statistics, one representative participant is selected from each group (1-, 2-, 3-, 4-, 7-, 8- and 11-session groups) for longitudinal trajectory analysis.

The participant from the one-session group fails to form a complete learning closed loop. Despite decent single-session performance (easy difficulty, accuracy 85%, completion time 6 min, vocabulary mastery Level 4), no observable competence growth can be identified.

Table 5. Weighted Distribution of Students' Exercise-difficulty Selection.

Exercise Difficulty	Selection Count	Weighted Proportion (%)	1-Session Group	2-Session Group	3-Session Group	4-Session Group	≥5-Session Group	Difficulty-Selection Trend (Continuous Practice)
Easy	8	12.31	3	2	0	0	3	Dominant in 1-2 sessions, decreasing afterwards
Medium	52	79.92	0	8	12	12	20	Predominant across all stages
Hard/Very Hard	5	7.77	0	0	0	0	5	Only selected in ≥5-session groups; proportion rises with frequency
Total	65	100.00	3	10	12	12	28	-

The participant from the two-session group attains accuracy improvement from 80% to 90% merely through AI support without extra teacher intervention. Vocabulary mastery remains at Level 5, completion time stabilizes at 10 min. The participant autonomously sticks to DeepSeek, consistently selects medium-difficulty exercises and raises explicit learning questions, manifesting clear autonomous-learning awareness. This confirms basic improvement effects of the tripartite model for low-frequency practitioners.

The participant from the three-session group shows fluctuating-yet-rising performance: accuracy increases from 70% to 80% then dips to 75%; completion time shortens from 10 min to 8 min before returning to 10 min; vocabulary mastery ascends from Level 2 to Level 3 and regresses to Level 2 due to inadequate command of extended meanings and part-of-speech collocations. The participant actively puts forward questions about reading speed and lexical usage, which signals awakening of autonomous-learning consciousness and partial breakthrough of learning bottlenecks.

The participant from the four-session group serves as a typical successful case of tripartite synergy. Despite minor fluctuations, accuracy surges from 60% to 100%, and completion time plummets from 20 min to 4–5 min (an 80% efficiency gain), fully meeting CET-4 test-taking requirements. The volunteer voluntarily attempts CET-6-level exercises and raises high-order questions about lexical usage, achieving profound advancement in both lexical competence and autonomous-learning depth.

The participant from the eight-session group gradually raises accuracy from 70% to 90%, with a temporary drop to 45% triggered by challenging very-hard-level exercises in the third round. Completion time decreases steadily from 12–18 min to 10–12 min. The learner transforms from mechanical rote memorization to context-driven vocabulary comprehension. Even with performance setbacks caused by high-difficulty trials, the participant can restore upward momentum under model support, which proves the model's capacity to sustain long-term autonomous learning amid performance volatility.

The eleven-session participant represents mature autonomous-learning performance. The learner flexibly switches AI platforms and difficulty levels and maintains stable accuracy between 80–95%. Temporary dips occur when tackling very-hard exercises, yet performance quickly rebounds. Completion time stabilizes within 9–15 min, realizing high-level stabilization of problem-solving competence and advanced lexical-application capacity.

The seven-session participant with low weighted accuracy constitutes an idiosyncratic case. Accuracy starts at 50% and gradually climbs to 80% across sessions, which further corroborates positive effects of continuous practice rather than invalidation of the tripartite model.

Longitudinal individual-trajectory analysis reveals that competence improves with sustained effective practice even when after-class learning proceeds discontinuously. Higher practice frequency brings larger-magnitude and more stable progress. These results validate the effectiveness of the “student-AI-teacher” tripartite collaborative model and demonstrate the research value of discontinuous after-class-learning data.

Most participants regard AI-customized exercises as powerful tools for vocabulary consolidation. Student Wang comments: “Ordinary exercise books cannot cover the exact words I want to practice, yet AI can generate targeted exercises for my needs.” This feedback highlights AI’s strength in producing personalized resources and remedies the deficiency of ill-fitting conventional after-class learning materials. Meanwhile, students’ self-planning and reflective competence are enhanced. Student Zhou states: “Previously I mechanically finished assigned homework. Now I can set my own vocabulary goals and truly take charge of my learning.” Rising accuracy boosts self-confidence and exploratory motivation. Student Guan shares: “Poor cloze-test performance used to make me doubt myself. Now I can control exercise difficulty. Witnessing gradual accuracy growth restores my confidence in English and drives me to invest more time in in-depth study.” A positive feedback loop (“gaining learning rewards → stimulating interest → advancing competence”) is formed, laying foundations for long-term model implementation.

Nevertheless, after-class autonomous-learning practice also exposes deficiencies: most participants suffer from insufficient practice persistence, with merely two-to-three sessions as common participation volume; only a small number of participants submit assignments throughout all eight weeks. A few students even attempt to generate teacher feedback by AI at early experimental stages, demonstrating slack learning attitudes and academic-integrity risks contradicting the original intention of autonomous learning. Some participants lack critical-thinking awareness and uncritically accept AI-produced exercises, answers and explanations in early phases. Large divergence emerges in later stages regarding prompt-writing competence: some learners quickly master techniques for high-quality exercise generation, while a small number of low-proficiency students cannot articulate precise requirements even after receiving guidance. Consequently, exercise quality varies sharply among individuals, reflecting gaps in digital literacy and critical-thinking competence required for AI-era autonomous learning.

4. Tripartite Synergy Mechanism and Curriculum-Based Ideological-Political Education Integration Pathways for AI-Empowered After-Class Autonomous Learning

Within the tripartite collaborative model, each agent fulfills differentiated roles. Students act as masters and responsibility-bearers of learning: they independently select target vocabulary, compose prompts, complete exercises and raise questions throughout the whole process. Generative AI serves merely as an auxiliary tool undertaking two core functions: producing customized cloze-test exercises to resolve resource shortages; rapidly responding to lexical-meaning and collocation queries to save information-retrieval time and allow students to focus on discourse comprehension and lexical application. As commented by Student Xian: “AI-generated exercises vary greatly in quality and logic. Deep knowledge acquisition still relies on teacher instruction.” This remark illustrates AI’s mechanical nature and confirms that AI cannot replace human reflection; humanistic care and value guidance remain the exclusive domain of teachers.

Teachers provide scaffolding support instead of dominating learning activities. This positioning avoids over-reliance on external support and consolidates autonomous-learning awareness and lifelong-learning capacities. AI adoption does not diminish teachers’ responsibilities but reshapes their functions: (1) skill instruction: imparting prompt-writing skills, vocabulary-memorization strategies and problem-solving tactics; for instance, guiding students to identify main clauses, logical connectors and key words to improve reading speed; (2) targeted support: addressing individual puzzles such as lexical distinctions and complex-sentence parsing; for example, guiding Student Ouyang to split long sentences into subject-predicate-object components; (3) value guidance: embedding curriculum-based ideological-political education into every procedure. Teachers stress academic integrity (forbidding direct AI answer generation), and encourage students to design exercise discourses featuring Chinese cultural themes. Such value-oriented functions cannot be realized by artificial intelligence.

According to phased characteristics observed in the eight-week experiment, tripartite collaboration can be divided into three stages.

(1) Adaptation Phase (Weeks 1–2): Teachers exert dominant influence by distributing prompt templates and stipulating AI-use academic-integrity norms. AI executes user instructions as a pure tool, and students engage in imitative learning.

(2) Consolidation Phase (Weeks 3–5): Students gain full subject status by independently choosing vocabulary and adjusting exercise difficulty. AI generates personalized resources, and teachers shift to targeted Q&A support. Stable “student-dominated, AI-assisted, teacher-supported” synergy comes into being. This phase corresponds to the critical threshold for model effectiveness identified by experimental data.

(3) Deepening-autonomy Phase (Weeks 6–8): Students fully control learning procedures, voluntarily attempt high-difficulty vocabulary and expand discourse themes. AI and teachers serve as emergency backup resources. Students’ autonomous-learning competence and critical thinking are fully activated to accomplish overarching educational objectives.

Under certain circumstances, the tripartite model may malfunction. The collaborative process breaks down if teachers only distribute templates without follow-up supervision and discussion on common-problem patterns, which results in poor prompt-writing capacity and practice discontinuation. If students lack clear learning objectives and self-planning capabilities, effective learning closed loops cannot be formed despite AI and teacher support, undermining model sustainability. Synergy completely collapses when students abuse AI to directly generate answers and evade independent thinking, turning AI from a learning aid into a cheating instrument. To counteract these risks, teachers can implement a tiered supervision system with weekly mini-feedback and monthly comprehensive reviews, establish full-cycle digital learning archives [16], formulate negative-list norms for AI usage to define functional boundaries of artificial intelligence, and set phased practice targets (minimum two sessions every three weeks) to strengthen process-oriented supervision and sustain tripartite-model effectiveness.

Rooted in the positioning of application-oriented undergraduate education, after-class-learning scenarios and national requirements for curriculum-based ideological-political education [2], this study constructs pathways to integrate language-competence cultivation and value guidance.

Foreign-language ideological-political education aims to equip students with capabilities to “tell Chinese stories in English” and counteract “Chinese-cultural aphasia” [17]. Teachers guide students to embed Chinese-themed elements when generating cloze-test exercises: for instance, generating discourses on China’s ecological-civilization construction when learning word *sustainable*; discourses on intangible-cultural-heritage preservation when learning word *heritage*; discourses on Chinese scientific-technological innovation when learning word *innovation*. Students acquire lexical knowledge while understanding national conditions and disseminating Chinese culture in contextualized practice. Ideological-political influence is achieved imperceptibly, transforming students from passive recipients into active communicators of Chinese narratives and solving the difficulty of delivering ideological-political education in decentralized after-class contexts. Follow-up evaluation indicators include the proportion of Chinese-themed discourses generated by students, shifts in voluntary selection frequency of Chinese-related themes, and informal-interview-based evidence of students’ evolving perceptions of “telling Chinese stories in English”, so as to verify educational outcomes and growth of cross-cultural-communication awareness.

To guarantee content validity and prevent excessive AI dependency, teachers emphasize that comprehension outweighs answer accuracy and clarify that AI functions as an “external auxiliary brain” for exercise generation and basic-information retrieval rather than a substitute for internal human cognition. Teachers share prompt-writing know-how, guide students to cross-check AI outputs against authoritative dictionaries and web resources, and impart digital-ethics and intellectual-property concepts to enhance critical-thinking and digital-literacy capacities. Differentiated guidance is implemented to bridge digital-competence gaps: one-on-one tutoring is offered to students with limited AI proficiency, while higher freedom is granted to digitally-competent learners. Aligned with lifelong-learning requirements in China Education Modernization 2035 [18], the model builds a closed-loop workflow of “autonomous planning-execution-reflection-optimization”. It reinforces the philosophy that learning is knowledge construction by learners themselves, and guards against cognitive hollowing caused by over-reliance on artificial intelligence and deterioration of logical and critical-thinking abilities. Concerning ideological-political norms for AI-generated discourses, teachers guide students to examine value orientations of AI outputs and add prompt constraints such as “avoid Western-centrism and objectively present Chinese images”, mitigating risks including historical nihilism and ideological infiltration embedded in generative-AI content.

5. Conclusions and Prospects

This study conducts an eight-week teaching experiment with 29 initial undergraduate participants from Guangdong University of Foreign Studies South China Business College. Seven invalid samples are excluded due to data deficiency, non-compliant exercise generation or illogical learning behaviors, leaving 21 valid samples for formal analysis. The tripartite collaborative model of “student-led autonomous generation, AI-enabled precise empowerment and teacher-targeted guidance” is constructed. Nevertheless, this research has limitations. Participants are restricted to Spanish majors; hence cross-major and cross-institutional representativeness is insufficient, and generalization of conclusions needs further validation. The eight-week experiment with discontinuous-data collection cannot capture long-term competence evolution (e.g., CET-4/6 scores and sustained after-class-learning behaviors). Long-term follow-up research spanning one-to-two academic years is required to evaluate enduring educational effects. Qualitative evidence mainly comes from Excel-form records and informal interviews; in-depth exploration of motivational and psychological mechanisms underlying learning behaviors remains limited. Future research can adopt richer qualitative instruments (structured interviews, learning journals) and establish multi-dimensional evaluation systems covering linguistic competence, autonomous-learning capacity, digital literacy and value-shaping outcomes, so as to develop comprehensive AI-empowered foreign-language educational frameworks.

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