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Original Research Article

Zhiqi Yantu: Exploring the Implementation Path of AI-Enabled Energy-Themed Cross-Cultural Narrative for College Students

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Abstract

Against the backdrop of China's global energy cooperation, developing college students' energy-related cross-cultural narrative competence is essential for international public communication. Traditional university English teaching prioritizes general-purpose English, while specialized bilingual resources for energy-themed narrative remain insufficient, limiting students' practical output capacity. This study adopts questionnaire survey and action-research approaches to explore feasible pathways for AI-empowered energy-focused cross-cultural narrative training. In total, 379 valid questionnaires from multi-disciplinary undergraduates were collected and analyzed via SPSS 26 for reliability, validity and descriptive statistics. A three-component bilingual corpus covering energy-specific terms, narrative sentence patterns and model essays was constructed. Built upon Tencent MetaQ, a dual-function AI agent integrating Grammarly, iFlytek and ChatGPT was developed to support knowledge retrieval and academic text polishing. A three-platform new-media communication matrix was operated for popular-science dissemination, accumulating 4566 total views for 12 released short videos. Results demonstrate that the integrated framework combining bilingual corpus resources, AI interactive tools, flipped-classroom design and new-media practice can effectively underpin students' energy-oriented ESP competence. Still, constraints including limited corpus granularity, unstable AI output precision, insufficient media influence and non-standardized team version-control persist. Targeted improvement strategies covering corpus iteration, AI optimization, classroom implementation, media operation and project governance are proposed. This research offers empirical references for higher-education ESP practice and youth international-communication talent cultivation.

Keywords: Artificial intelligence; energy-oriented English; cross-cultural narrative; ESP; college students; implementation path.

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1. INTRODUCTION

Under the Dual-Carbon strategic framework, China's energy-sector international collaboration keeps expanding. Effectively communicating China's energy development to global audiences requires young talents who combine basic energy domain awareness with competent cross-cultural English narrative skills. Nevertheless, most undergraduate foreign-language curricula focus on general English, whereas teaching resources and practical training targeting energy-related English for Specific Purposes (ESP) are comparatively scarce. Many undergraduates encounter obstacles including insufficient specialized terminology storage, narrow cross-cultural perspectives, and inadequate capability to produce externally-oriented English narrative texts.

Generative artificial intelligence provides new technical possibilities for ESP teaching. AI can assist terminology query, sentence rewriting and multilingual conversion, alleviating the shortage of teaching resources. However, direct application of generic large-language models without domain-specific corpus constraints may generate inaccurate professional content or inappropriate narrative stance. Therefore, it is necessary to investigate how self-built bilingual corpus, customized AI agents, classroom pedagogy and online communication practice can be coordinated to foster undergraduates' energy-themed cross-cultural narrative competence. This paper presents empirical findings derived from an undergraduate innovation-training project and discusses actionable implementation pathways.

2. RESEARCH METHODOLOGY

2.1 Research Objectives

This study seeks to construct and validate an integrated training framework for college students' energy-themed cross-cultural narrative empowered by artificial intelligence. Specific objectives include:

1. To investigate undergraduates' actual demands and difficulties in learning energy-oriented English across different majors;
2. To build a domain-specific bilingual corpus consisting of term bank, sentence-pattern bank and model-essay bank;
3. To develop a lightweight dual-module AI agent for energy-English knowledge query and text polishing;
4. To design flipped-classroom procedures and implement new-media-based narrative practice;
5. To identify practical limitations and summarize feasible improvement paths for similar educational practices.

2.2 Research Methods

This study combines questionnaire survey and action-research; no semi-structured interview data are collected.

Questionnaire survey: Two rounds of online questionnaires were distributed to undergraduates covering arts, science and engineering disciplines. A total of 379 valid samples were retained. SPSS 26 software was used for reliability-validity testing and descriptive statistical analysis, revealing learners' pain points and expectations for energy-English learning and AI-assisted training.

Corpus development: Open-access energy industry reports, official international communication documents and academic literature were screened, translated and manually proofread. The resulting bilingual corpus serves both as learning material and the knowledge base feeding the customized AI agent.

AI-agent development: Tencent MetaQ was adopted as the foundational large-model framework. Grammarly, iFlytek and ChatGPT were integrated to realize grammar checking, text processing and content generation functions. Prompt engineering and corpus injection were repeatedly performed to constrain model outputs. All machine-generated content was manually audited to reduce factual errors.

Action research: Research team implemented new-media content production on Bilibili, Douyin and Xiaohongshu. Short-video popular-science outputs, preliminary flipped-teaching scheme design and iterative adjustment of corpus and AI tools were completed. Practical difficulties encountered during implementation were systematically recorded for subsequent analysis.

3. RESULTS

3.1 Questionnaire Findings

Survey results show that most respondents have not received systematic energy-English instruction. Major self-reported difficulties are memorizing energy-specialized vocabulary and constructing coherent English narratives concerning energy topics. Participants expressed positive willingness to adopt AI tools for term lookup and manuscript revision. Meanwhile, flipped-classroom modes and short-video-based popular science were regarded as acceptable supplementary learning forms. The survey evidence supports the necessity of developing domain-specific resources and AI-assisted learning instruments.

3.2 Construction of Bilingual Energy-English Corpus

Three interrelated sub-corpora were finalized after collection and proofreading. The term bank stores Chinese-English parallel terminology across major energy sub-fields. The sentence-pattern bank collects frequently-used rhetorical and argumentative expressions suitable for cross-cultural energy storytelling. The model-essay bank assembles authentic bilingual narrative samples. The corpus provides domain-grounded inputs for AI-agent knowledge base as well as in-class and after-class student exercises.

3.3 Performance of Multi-tool-fused AI Agent

Two functional modules were established. The knowledge-query module responds to inquiries about energy terminology and industry background. The text-polishing module revises students' self-written energy-related English drafts on sentence structure and expression appropriateness. Restricted by corpus scale and prompt settings, multi-round complex dialogue performance remains limited, and response accuracy varies across highly-specialized energy sub-topics. The agent is positioned as auxiliary learning tool rather than a substitute for students' independent thinking and narrative construction.

3.4 New-media Practice Outcomes

Twelve popular-science short-video productions were released across Bilibili, Douyin and Xiaohongshu, achieving 4566 cumulative total views. Stable basic account operation and user interaction were realized. Even so, serialized content series have not been fully established, and overall communication influence remains moderate. The platform demonstrates potential for displaying student narrative outputs but requires further systematic content planning.

3.5 Preliminary Flipped-teaching Design

Based on corpus resources and AI-agent functions, a preliminary flipped-classroom workflow was designed: pre-class AI-supported terminology preparation and draft writing; in-class case discussion and critical revision exercises targeting AI-produced texts; post-class narrative-writing assignments. Further real-classroom implementation is reserved for follow-up research phases.

4. DISCUSSION

Empirical practice indicates that the four-dimensional framework: bilingual corpus

foundation, AI-assisted interactive learning, flipped-classroom pedagogy and new-media-driven practice can promote undergraduates' energy-themed cross-cultural narrative competence. Nevertheless, several practical constraints deserve attention.

First, corpus granularity is insufficient for highly-specialized subdivided energy topics. Partial materials lack rigorous domain-expert review, which may impair the reliability of downstream AI outputs. Continuous material expansion and professional proofreading mechanisms are indispensable.

Second, the customized AI agent still exhibits instability for complicated multi-turn conversations and niche-domain questions. Students may fall into the risk of over-reliance on machine-generated full texts. Pedagogical guidance must emphasize that AI serves revision and reference purposes while narrative conception, value stance and logical organization belong to student-centered creation.

Third, new-media communication effect is constrained by irregular updating schedules and the absence of systematic content columns. To realize the "learning-creation-public display" closed-loop, stable release rhythm and platform-oriented content planning should be introduced.

Fourth, multi-member collaborative work faces file-synchronization and version-management risks. Standardized archiving and regular team-supervisor communication are required to guarantee sustainable resource iteration.

Correspondingly, optimized implementation paths are summarized:

1. Corpus construction: Expand bilingual resources covering subdivided energy sectors and implement regular professional-review procedures to improve corpus authority.
2. AI-agent iteration: Optimize prompt sets and embedded knowledge base; improve multi-tool linkage; clarify AI's auxiliary status within teaching scenarios and strengthen student critical-thinking training against machine outputs.
3. Flipped-classroom execution: Formalize pre-class, in-class and post-class teaching links; organize theme-oriented practical competitions to generate student narrative works.
4. New-media operation: Develop differentiated serialized columns for each platform, transform classroom practical outputs into online-published short-video content and expand project social influence.
5. Project governance: Standardize version-control and document-archiving workflows; maintain periodic team-supervisor communication to raise multi-person collaboration efficiency.

5. CONCLUSION

Targeting the demand for youth international-communication talents in the energy domain, this study explores an AI-supported training model for college students' energy-featured cross-cultural narrative competence. Evidence from 379 multi-major questionnaires and action-research practice suggests that the integration of domain-specific bilingual corpus, customized AI learning agent, flipped-classroom design and new-media practice delivers feasible solutions for energy-oriented ESP education. Reliable self-built domain corpus is a necessary precondition; pure dependence on generic large-language models cannot satisfy specialized foreign-language teaching requirements.

Limitations of this research should be noted. The present action research does not include controlled teaching-experiment data. Future work will expand participant sample size, carry out classroom-based controlled comparison experiments and continuously polish corpus and AI-agent performance to further verify the effectiveness of the proposed pathways. This work can serve as practical reference for universities cultivating compound talents with both energy-industry awareness and cross-cultural English narrative capacity.

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