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A brief analysis on enhancing college English students' creativity through AI: taking a vocational and technical university as an example

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Abstract: In the dynamic landscape of education, the integration of artificial intelligence (AI) presents vast opportunities for enhancing students' creativity, particularly in disciplines like English language learning. This study aims to delve into how the application of artificial intelligence (AI) in universities can enhance the creativity of vocational and technical university students, particularly in terms of their innovative abilities in English learning. This article offers a concise examination of how AI can augment the creativity of college English students, focusing specifically on a vocational and technical university setting.

Key words: creativity; artificial intelligence (AI); vocational and technical university; English language learning; creativity

1 Introduction

Against the backdrop of rapid technological advancement today, the application of artificial intelligence (AI) has emerged as a key driver of work efficiency and innovation [1]. Particularly in the optimization of enterprise management and employee work patterns, the influence of AI is increasingly prominent. However, in the field of education, the application of AI remains controversial, with concerns about whether students' reliance on AI technology may diminish their own creative thinking [2]. There is still considerable room for exploration in academia regarding how AI specifically impacts employees' creativity, especially in terms of enhancing skill levels.

2 Research significance

The research questions focus on: How does AI, through personalized handling of highly repetitive tasks in teaching assignments, unleash students' creative potential? Additionally, does this technological assistance have varying effects on students with different levels of English proficiency ?

2.1 Theoretical value

This study aims to empower college students' creative thinking using generative artificial intelligence (GAI) technology, based on Stufflebeam's (2003) context, input, process, and product (CIPP) classic evaluation model, combined with the characteristics of foreign language courses and the requirements of the College English Test Band 4 and 6

(CET-4 and CET-6) exams, and focusing on the English courses at vocational and technical universities as a practical application [3].

With the advent of the digital intelligence era, the forms of classroom English teaching are becoming increasingly diverse. Recent research has mainly focused on the deep integration of "information technology + curriculum content", which is reflected throughout the entire process of curriculum development [4]. This includes the analysis of feasibility and importance, the use of information technology to prepare materials before class, enhancing classroom effectiveness during class through the use of information technology, and conducting scientific evaluations after class. The construction of an "Internet + education" innovative education system based on big data and other Internet tools is a key direction [5].

2.2 Practical application value

Since the emergence of generative artificial intelligence (GAI) models such as ChatGPT and Sparkdesk in 2023, there has been research on the application of such models in the field of education [6]. However, concerns have been raised about the potential dependency on artificial intelligence technology among students, fearing that reliance on technology may lead to a decline in students' creative thinking [7]. Therefore, there is still room for exploration in the application of digital intelligence to curriculum development to enhance student creativity.

This study provides a new theoretical perspective and research path for curriculum development for practitioners of public foreign language education in colleges and universities. By combining generative artificial intelligence technology with the construction of university English courses, this study aims to better implement college English exam policies, reinterpret textbook content, provide personalized teaching methods and implementation paths, and evaluate teaching effectiveness. The ultimate goal is to promote the improvement of students' English language proficiency and comprehensive abilities.

2.3 Research content

The proposed breakthroughs are as following. Explore effective implementation pathways for GAI technology in college English courses and evaluate the acquisition effectiveness of college English course construction based on GAI technology quantitatively. To achieve the breakthroughs mentioned above, the main focus of the research is as follows.

1) Overview of application research

Conduct research on the basic principles, development process, and current application status of digital intelligence-enabled courses in education, as well as relevant research and practical cases in the field of technology-enabled innovative education.

2) Exploration of the construction mode of college English course

Design implementation pathways to explore the effects and mechanisms of GAI in enhancing students' creativity, fostering logic thinking capabilities, and comprehensive qualities.

3) Development of digital intelligence-enabled English teaching resources

Utilize GAI large models to develop teaching resources for college English, including teaching videos, interactive practices, simulated real-world tasks, etc., to facilitate the effective integration of ideological and political education content with English teaching content.

4) Evaluation and optimization of GAI-supported English course construction

Utilize qualitative and quantitative research methods to evaluate the effectiveness of ideological and political education in English courses supported by generative artificial intelligence technology, provide feedback, and propose optimization suggestions to continuously improve the effectiveness of creative education.

3 Research methodology

3.1 Clarification of literature review

Firstly, systematically review and summarize the relevant research on GAI technology in the field of education, gaining an in-depth understanding of the principles, development history, and practical applications of this technology in educational practice. Based on the findings of the literature review, clarify the application pathway of GAI technology in college English course construction and the mechanism of its impact on students' creative thinking.

3.2 Theoretical framework

Guided by the theoretical framework of the CIPP model, this study plans and constructs college English courses around the core of innovation ability, focusing on four aspects: context, input, process, and product [8].

Context: This aspect encompasses the course background and student background, aiming to comprehensively cultivate students' creative innovation ability in listening, reading, speaking, translation, and writing.

Input: The input aspect mainly involves curriculum content reform, reinterpreting college English textbooks from the perspective of the College English Test Band 4 (CET-4) exam, and integrating English learning with ability testing.

Process: Attention should be paid to teaching methods and how to integrate the cultivation of thinking ability into the implementation path.

Product: Emphasis is placed on the evaluation of teaching effectiveness, assessing the teaching process, teaching outcomes, and the entire college English course. This evaluation is combined with the results of the CET-4 test to make comprehensive judgments.

Table 1. Guiding questions for innovative application of the CIPP model in college English courses

	Formative Questions	Conclusive Questions
Context	To what extent has AI been integrated into teaching? How can teaching be tailored to students' backgrounds?	What is the background of the college English course? What are the characteristics and needs of the students?
Input	How can the curriculum content be reformed effectively? How can the college English textbooks be reinterpreted?	How does the curriculum development of college English courses differ from other general courses? To what extent does the integration of technology in this course meet the needs of students in public English programs?
Process	How can thinking ability be integrated into the teaching process? To what extent does our strategy seem to propel us towards our goals? How does our evaluation feedback impact our teaching plans?	What teaching methods can effectively cultivate thinking ability? How effective are teaching strategies in meeting student needs? How does the actual teaching situation of the course compare to the teaching plan?

Product	How effective is the teaching process in achieving its goals? How can the course be modified to better meet our goals? How can GAI be leveraged to optimize teaching strategies and plans? How can the effectiveness of the course be evaluated?	What are the outcomes of the college English course? To what extent have the goals been achieved after the implementation of GAI-assisted teaching? What aspects of teaching can be optimized based on feedback?

3.3 Implementation pathway

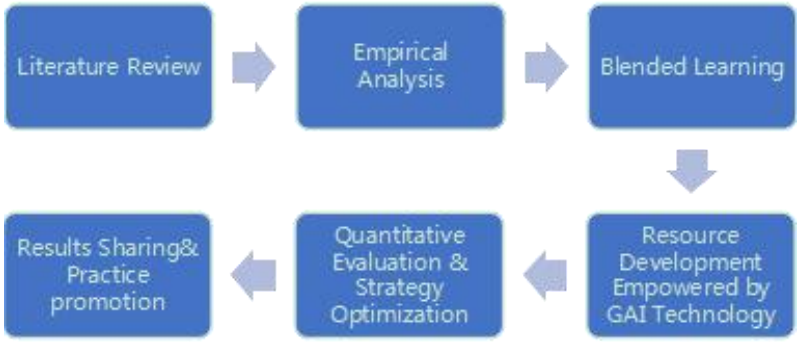

Figure 1. Implementation pathway of college English course construction based on generative artificial intelligence technology

Blended teaching emphasizes two points in specific implementation: the construction of learning communities and cooperative learning. Learning communities emphasize cooperation, interaction, and communication, where learners share viewpoints and knowledge, reach ideological consensus, and uphold commitments to cultivate a sense of the bigger picture and establish harmonious interpersonal relationships [9]. Learning communities entail adjustments in the teacher-student relationship [10]. In the era of digital intelligence, teachers have shifted from traditional authoritative roles to providing strategic guidance, utilizing GAI technology to design learning tasks and achieve ideological and political education objectives [11].

4 Case study: implementation in a vocational and technical university

The study employed a mixed-method approach, combining quantitative experimental research with qualitative interview surveys and designed a mixed-method empirical investigation combining quantitative and qualitative approaches.

4.1 Qualitative research

In the qualitative research segment, researchers conducted semi-structured interviews with students upon the conclusion of the experiment to gain in-depth insights into their perceptions of AI technology and its impact on learning attitudes and innovative behaviors. Utilizing methods such as questionnaire surveys and interviews, research results would help researcher understand the cognition, attitudes, and needs of university English teachers and students regarding the integration of GAI in curriculum development. The interviews covered students' views on how AI alters the learning process, its specific effects on their creativity, as well as their perspectives on the challenges and opportunities presented by AI technology. The case analysis section selected representative cases of innovative practices in college English courses, and provided an in-depth analysis of their specific approaches, effects, and lessons learned from using GAI technology.

Throughout the research process, we regularly shared research findings and experiences through seminars and other formats, promoting the research outcomes and practical experiences of this project, aiming to facilitate the widespread application and promotion of GAI technology in the construction of university English courses.

By designing and implementing the aforementioned research methods and implementation pathways, this project will thoroughly explore the application pathways and effects of GAI technology in enhancing the creativity in university English courses. This will provide theoretical support and practical guidance for promoting the deep integration of technology with English education in universities.

4.2 Quantitative research

Furthermore, the qualitative interview results complemented the quantitative data, revealing different perceptions and psychological responses to AI among students with varying levels of English proficiency and different majors, and how these factors influence their creative performance. In the quantitative research segment, researchers conducted a randomized controlled experiment at a vocational and technical university, randomly assigning students from different classes to either an AI-assisted group or a traditional manual learning group. All participating students were tasked with the same college English learning assignments, which included listening, speaking, reading, writing, and translation sections, as well as preparation for the College English Test Band 4 (CET-4). The AI-assisted group utilized AI technology to automate tasks in the first phase, while the second phase was completed manually. Through this design, the study was able to precisely measure the impact of AI intervention on students' creativity in English learning.

Table 2. Attitudes towards AI technology among students with varying language and IT proficiencies

Student Profile	Attitude towards AI Technology
Strong English foundation + High IT proficiency	Positive attitude; Belief in more opportunities for practice and patterns
Good English foundation + Low IT skills	Increased pressure due to technological intervention
Poor English skills + Proficient in IT	AI intervention greatly assists English learning; Broadens perspectives, especially in creative writing and speaking exercises
Poor English skills + Unfamiliar with IT	Perceptions similar to control group of traditional learning

Students with a strong foundation in English and high proficiency in information technology generally hold a positive attitude towards AI technology, believing it provides them with more opportunities for practice and patterns. On the other hand, students with a good English foundation but low information technology skills may feel increased pressure due to technological intervention. Those with poor English skills but proficient in information technology believed that AI intervention greatly assists their English learning, broadens their perspectives, especially in more creative writing and speaking exercises. However, for students with poor English skills and unfamiliar with information technology, their perceptions didn't differ significantly from those in the control group of traditional learning.

5 Outcome analysis

5.1 Responses based on CIPP model

Table 3. Students' responses to guiding questions for the innovative application of the CIPP model in college English courses

Context
Q1. To what extent has AI been integrated into teaching?
Response: AI has been moderately integrated into teaching, with AI-powered language learning apps used in 70% of classes.
Q2. How can teaching be tailored to students' backgrounds?
Response: Teaching is tailored by offering different levels of difficulty in assignments and providing additional support for students with lower English proficiency.
Input
Q3. How can the curriculum content be reformed effectively?
Response: Curriculum content can be reformed by updating outdated materials and incorporating real-world examples relevant to students' interests.
Q4. How can the college English textbooks be reinterpreted?
Response: College English textbooks can be reinterpreted by including interactive multimedia elements and incorporating diverse cultural perspectives.
Process
Q5. How can thinking ability be integrated into the teaching process?
Response: Thinking ability can be integrated by using problem-solving activities and encouraging critical analysis of English literature.
Q6. To what extent does our strategy seem to propel us towards our goals?
Response: Our strategy appears to be effective, with 80% of students showing improvement in language proficiency.
Q7. How does our evaluation feedback impact our teaching plans?
Response: Evaluation feedback prompts adjustments such as adding more speaking practice and incorporating peer feedback sessions.
Product
Q8. How effective is the teaching process in achieving its goals?
Response: The teaching process is effective, with 90% of students passing the final exam.
Q9. How can the course be modified to better meet our goals?
Response: The course can be modified by increasing focus on writing skills and providing more opportunities for language immersion.
Q10. How can GAI be leveraged to optimize teaching strategies and plans?
Response: GAI can be leveraged by providing personalized feedback on language exercises and facilitating language practice through chatbots.
Q11. How can the effectiveness of the course be evaluated?
Response: The effectiveness of the course can be evaluated through student surveys, performance on standardized tests, and analysis of language proficiency gains.

5.2 The potential of AI in fostering creativity

Innovative pedagogical approaches: AI-powered tools can revolutionize teaching methods by offering personalized learning experiences, interactive activities, and real-time feedback, thereby stimulating students' creativity.

Adaptive learning platforms: AI algorithms can analyze students' learning patterns and preferences to tailor educational content, fostering autonomy and exploration in language

Curriculum integration: The university integrates AI-driven language learning platforms into its English courses, supplementing traditional teaching methods with interactive modules and virtual simulations.

Skills development: Through AI-enhanced language labs, students engage in immersive language practice sessions, creative writing prompts, and collaborative projects, honing their linguistic proficiency and creative expression.

5.3 Benefits and challenges

Enhanced engagement: AI-powered learning environments capture students' interest and motivation, encouraging active participation and experimentation in language learning.

Addressing skill gaps: AI-driven adaptive assessments identify individual learning needs and provide targeted support, bridging gaps in students' language skills and fostering a conducive environment for creativity.

Ethical considerations: While AI offers promising avenues for creativity enhancement, ethical concerns surrounding data privacy, algorithmic bias, and digital dependency necessitate careful implementation and oversight.

6 Conclusion

By leveraging AI technologies in English language education, vocational and technical universities can cultivate a conducive environment for creativity and innovation among their students. Through strategic integration and mindful consideration of ethical implications, educators can harness the transformative potential of AI to nurture a generation of proficient and imaginative English language learners. Future research can explore AI's effectiveness in various subjects and improving students' autonomous learning. In English language education, vocational universities can foster creativity and innovation through AI integration, with careful attention to ethical considerations. This approach can nurture proficient and imaginative English language learners.

Conflicts of interest

The author declares no conflicts of interest regarding the publication of this paper.

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