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Artificial Intelligence Empowers In-depth Transformation of English Classroom in Vocational Education

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Abstract: Against the background of deep integration of "Artificial Intelligence + Education", aiming at the problems in secondary vocational English classrooms such as crude learning situation analysis, homogenized resources and insufficient personalization, this study takes the lesson New Technologies in Everyday Life as the carrier to explore the full-process application of AI technology in pre-class intelligent diagnosis, in-class interactive teaching and after-class personalized feedback. By constructing a closed-loop teaching integrating the Reading Circle model and AI technology, it breaks students' bottleneck in expressing new technologies in English. Practical data show that the error rate of students' use of vocabulary about new technologies in the experimental class decreased by 32%, and the completion quality of the task of introducing Fuxing Hao increased by 45%. It provides a replicable practical paradigm for the intelligent transformation of vocational education classrooms.

Keywords: Artificial Intelligence; Vocational Education; English Teaching; Classroom Transformation; Reading Circle Model

1. Introduction

With the strategic advancement of China Education Modernization 2035 and the National Vocational Education Reform Implementation Plan, vocational education is required to cultivate interdisciplinary talents with both international vision and professional technical capabilities. As the core tool for technical exchanges, the teaching effectiveness of English directly determines the quality of talent training in vocational colleges. Nevertheless, current English teaching in secondary vocational schools still faces prominent challenges. First, student learning analysis relies on empirical teaching experience, making it difficult to accurately identify students' weaknesses in English proficiency. Second, teaching resources are disconnected from real-life technical scenarios, leaving students lacking linguistic support to discuss emerging technologies in English. Third, the traditional one-size-fits-all teaching model ignores individual differences among students, resulting in uneven learning outcomes.

Li and Lin (2021) pointed out that current secondary vocational English teaching is generally divorced from authentic vocational and technical scenarios, and homogeneous classroom teaching prevails. Most students only master basic English vocabulary and sentence patterns and struggle to conduct in-depth English expression and communication on technical content, leading to weak overall vocational English application competence [1]. Meanwhile, Wang (2023) proposed that artificial intelligence and big data technology provide innovative support for the reform of secondary vocational English teaching. Such technologies can effectively compensate for the drawbacks of traditional teaching, such as experience-dependent learning assessment and unitary teaching modes, and facilitate the implementation of personalized, scenario-based, and targeted English teaching [2].

Taking the unit of "New Technologies in Everyday Life" for Grade Two secondary vocational students as a teaching case, this study focuses on familiar technological themes such as China Railway High-speed (CRH). By reconstructing classroom teaching procedures with artificial intelligence technology, it explores a new teaching paradigm featuring "data-driven instruction, scenario adaptation and personalized development". This study aims to solve the core teaching problems whereby students can only recognize technical terms but fail to elaborate on technical characteristics, and their English expressions are limited to basic sentence structures, providing practical

references for the intelligent transformation of English classrooms in vocational education.

2. Implementation Path of Artificial Intelligence Empowering English Classrooms in Vocational Education

2.1 Pre-class: Intelligent Diagnosis and Precise Resource Push — Solving the Problem of "Vague Learning Situation"

In view of secondary vocational students' weak foundation in English and insufficient cognition of technical vocabulary, the pre-class session builds a "pre-learning – diagnosis – push" closed loop relying on an AI teaching platform (such as the Smart Classroom system). It realizes the shift of teaching starting point from "empirical judgment" to "data-driven decision-making".

(1) Intelligent speech diagnosis: Breaking the Bottleneck in Pronunciation of Technical Vocabulary Three days before class, teachers assign follow-up reading tasks of new technical vocabulary such as "3D-printing technology" and "self-repairing material" via the platform. Based on speech recognition technology, the system automatically analyzes students' pronunciation accuracy (matching degree with standard pronunciation), speaking fluency (number of pauses), and stress placement, and generates personalized assessment reports. Breaking through the limitations of subjectivity and ambiguity in traditional oral English evaluation for secondary vocational students, this intelligent evaluation method captures subtle problems in students' oral output from a refined dimension and realizes quantitative assessment and accurate diagnosis of oral English proficiency (Zhou, 2024). [3] Meanwhile, relying on standardized speech databases for multi-dimensional intelligent analysis, the system can intuitively identify students' weaknesses in technical oral English, providing accurate data support for teachers and students to carry out targeted error correction and personalized training (Chen, 2025). [4] For example, if a student weakens the ending sound of "repairing" in "self-repairing material", the system marks the phonetic symbol /rɪˈpeərɪŋ/ and pushes micro-lessons for pronunciation correction. If another student misplaces the stress of "technology" on the third syllable, the system recommends stress mnemonics for memorization. This workflow of "autonomous reading – intelligent error correction – targeted consolidation" raises the initial mastery rate of technical vocabulary from 62% to 89%.

(2) Thematic resource push: Activating Background Knowledge of Technologies Based on students' historical learning data (such as video viewing duration and vocabulary test accuracy), the platform intelligently pushes a themed resource package of "Top 10 World-leading Technologies in China". The package contains three types of materials: 1) Interactive videos (click new words to pop up English definitions and scenario pictures; for instance, "drones" is linked to videos of express delivery and agricultural plant protection); 2) Mini-lectures (5-minute explanation of technical parameters and global status of Fuxing Hao); 3) Discussion topics ("Which technology do you think changes your life most?"). After students finish previewing, the platform calculates the video completion rate (92%) and average interactive clicks per person (8 times), providing evidence for teachers to capture students' interests.

(3) Visualized learning situation: Supporting Differentiated Teaching Strategies One day before class, the platform generates a heat map of class learning profiles, showing "vocabulary weak points" (e.g., the recognition rate of "wearable technology" is only 45%), "video interests" (78% of students pay attention to application scenarios of smart glasses), and "expression barriers" (83% of students cannot use "in terms of speed" to compare technical advantages). Teachers adjust teaching priorities accordingly: add situational dialogue demonstrations about "wearable technology", and strengthen practice of comparative sentence patterns such as "in terms of" in reading sessions.

2.2 In-Class: Intelligent Interaction and Stratified Teaching — Constructing a "Deeply Participatory" Classroom

This lesson adopts the Reading Circle pedagogical framework and integrates virtual reality contexts, intelligent collaborative platforms, and automated writing assistance technologies to establish a systematic "input-interaction-output" linguistic development loop. This instructional design transforms student learning from passive knowledge reception toward active meaning construction.

(1) Warm-up session: Intelligent Contextualization for Pragmatic Competence Activation

Traditional brainstorming activities are often restricted by abstract situational settings, monotonous instructional materials, and insufficient student engagement. To address these pedagogical limitations, this session applies intelligent technologies to construct an immersive learning scenario themed "Future Smart Life". Students enter virtual environments such as intelligent shopping malls and unmanned railway stations via tablet devices. They conduct voice-based interactive communication with virtual agents including intelligent shopping guides and train attendants to complete pragmatic dialogue tasks, such as consulting operational procedures of self-service ticket machines.

The intelligent teaching system provides real-time and multidimensional linguistic feedback on learner output. It identifies syntactic deficiencies and conducts targeted grammatical correction for incomplete sentence structures. It also delivers optimized lexical recommendations to replace simplistic expressions with authentic and context-appropriate chunks. In addition, the system recognizes learners' emotional states through tonal analysis and offers adaptive encouragement throughout the learning process.

The pedagogical model combining immersive contextual simulation and instant instructional feedback increases students' average oral utterance length from 5.2 words to 8.7 words. A total of 85% of students can initiatively apply target linguistic chunks, which effectively enhances the overall quality of learners' oral production.

(2) Pre-reading stage: Intelligent Scaffolded Reading for Reduced Text Decoding Barriers

Text matching tasks constitute a fundamental pre-reading procedure for effective discourse comprehension. In conventional classrooms, students demonstrate inadequate keyword localization strategies, resulting in a baseline matching accuracy of only 58%. To improve learning performance, the system integrates an intelligent keyword highlighting function that automatically identifies and marks core lexical items corresponding to thematic labels, thereby establishing explicit semantic connections between topics and textual content.

When students click on unfamiliar vocabulary items, the system presents multimodal lexical resources, including standard English definitions, real-scene illustrations, and practical application videos. Such multidimensional scaffolding enables students to build systematic semantic associations among lexical meaning, situational contexts, and functional applications.

This intelligent instructional design raises students' text-matching accuracy to 91%. More importantly, it cultivates learners' strategic competence in keyword-based thematic identification and lays a solid methodological foundation for subsequent long-discourse reading and in-depth textual analysis.

(3) While-reading phase: Intelligent Collaborative Learning for Visualized Cognitive Construction

This lesson implements a standardized Reading Circle cooperative learning model, dividing students into six-member groups with differentiated roles such as vocabulary analysts, text summarizers, and discussion coordinators. Traditional collaborative learning commonly encounters problems including unfocused discussions, ambiguous role division, and low learning efficiency [5].

To optimize group learning quality, an intelligent collaborative platform regulates instructional procedures from three dimensions: adaptive role allocation, real-time process recording, and cognitive guidance intervention [5]. The platform assigns group roles according to students' linguistic proficiency to ensure reasonable task distribution and balanced participation.

During group discussions, the system automatically records individual speaking frequency and contribution types, converting implicit cognitive processes into visualized semantic tags on shared whiteboards. This technique externalizes students' internal thinking and improves the transparency of collective inquiry.

When group discussions deviate from learning objectives, the system releases heuristic guiding questions to adjust learners' analytical perspectives and refocus classroom inquiry. The technological optimization effectively promotes collaborative efficiency, deepens students' critical thinking, and achieves high-quality outcomes in interactive reading instruction.

Intelligent role matching: The platform automatically assigns roles according to pre-class learning data. Students with weak language foundation act as vocabulary experts (sorting out new words in paragraphs); students with strong expressive ability serve as summarizers (extracting main ideas); students with clear logic

work as discussion facilitators (putting forward inquiry questions). For example, the vocabulary expert of one group obtains an extended word list of "self-repairing material" from the platform (e.g., "durability", "automatic repair"), effectively reducing vocabulary barriers for group members.

Recording and intervention in discussion: When students discuss on tablets, the platform transcribes texts in real time, analyzes keywords (such as "speed", "comfort", "safety") and generates discussion heat maps. If a group deviates from the theme of "advantages of high-speed rail" (e.g., too much talk about high-speed rail fares), the system automatically pushes guiding questions: "What technologies help Fuxing Hao run faster and more safely?" to refocus discussion on core content.

Deepened thinking: Through semantic analysis, the system identifies superficial viewpoints in discussions (e.g., "Fuxing Hao is fast") and pushes extended resources (e.g., "Fuxing Hao uses lightweight materials to reduce energy consumption"), guiding students to shift from phenomenon description to cause analysis. Such data-driven collaborative intervention raises the proportion of valid remarks in group discussion from 42% to 79%, and 90% of students can propose at least two viewpoints about technical advantages from different perspectives during discussion.

(4) Post-reading: Intelligent Writing Assistance — Achieving Transfer from Input to Output

Writing reflects students' comprehensive English ability. But in traditional teaching, students often produce low-quality outputs with many grammatical errors and empty content. In this session, the intelligent writing system provides triple supports: grammar correction, content expansion and personalized feedback.

Precise grammar correction: After students finish the first draft introducing Fuxing Hao, the system automatically identifies grammatical mistakes (e.g., "is" should be replaced by "are" in "It is the new generation..."), marks error types (subject-verb disagreement), and provides revision examples ("It is the new generation of high-speed trains developed by China on its own.").

Intelligent content expansion: Based on text semantic analysis, the system recommends advanced expressions (e.g., replace "good" with "in terms of speed, technology and comfort") and sentence pattern templates ("Not only... but also..."). For instance, for the original sentence "Fuxing Hao is fast.", the system recommends the expanded version: "Not only does Fuxing Hao run at a speed of 350 km/h, but it also offers more spacious seats and advanced entertainment systems."

Personalized feedback: The system generates an ability radar chart based on students' writing data (marking grammatical accuracy, content richness and logical coherence), and pushes targeted suggestions for improvement (e.g., "Strengthen the use of present perfect tense."). Combined with system feedback, teachers focus on guiding 2 to 3 students with weak foundations to realize precise tutoring.

The main title (on the first page) should begin from the top edge of the page, centered, and in Times New Roman 16-point, boldface type. Capitalize the first letter of nouns, pronouns, verbs, adjectives, and adverbs; do not capitalize articles, coordinate conjunctions, or prepositions (unless the title begins with such a word). Please initially capitalize only the first word in other titles, including section titles and first, second-order headings (for example, "Titles and headings" — as in these guidelines). Leave two blank lines after the title.

2.3 After-Class: Intelligent Evaluation and Personalized Learning Recommendation — Extending the Path of "Lifelong Learning"

The after-class session forms a closed loop of stratified assignments, data tracking and resource recommendation via the intelligent platform. It breaks the one-size-fits-all assignment model and meets students' needs for personalized development.

(1) Stratified assignment design: According to classroom performance and assignment completion, the platform divides homework into basic, improvement and expansion layers. For the basic layer (about 30% of students), it pushes word-spelling games (e.g., matching technical vocabulary with pictures) and sentence translation exercises (e.g., translating Chinese technical parameters into English). The system automatically grades tasks and generates error notebooks with explanatory videos. For the improvement layer (about 50% of students), it assigns the task of comparing technical advantages (e.g., comparing technical features of Fuxing Hao and Japanese Shinkansen), requiring writing with the sentence pattern "in terms of". For the expansion layer (about 20% of students),

it recommends English science and technology news (e.g., the column High-speed Rail Development from China Daily) and requires reading reflections containing technical features and personal opinions.

(2) Learning path recommendation: The platform generates personalized learning reports based on students' one-week learning data (such as vocabulary mastery rate and types of writing errors). For example, if a student only masters 60% of vocabulary about "wearable technology", the system pushes English videos about application scenarios of smartwatches. If another student struggles with comparative sentence patterns, the system pushes micro-lessons on making sentences with "in terms of" and "compared with". Such data-driven resource push helps students shift their learning goal from "completing tasks" to "making up for weaknesses".

3. Effect and Reflection on Classroom Transformation Empowered by Artificial Intelligence

3.1 Teaching Effect: Dual Improvement of Students' Ability and Literacy

After one semester of practice, comparative data between the experimental class (35 students) and the control class (35 students) show that the AI-empowered classroom achieves remarkable results in three dimensions: linguistic competence, thinking quality and professional literacy.

(1) Linguistic competence: More Accurate Use of Technical Vocabulary and Greater Confidence in Complex Expression

In the final oral assessment, the proportion of students within the experimental class who demonstrated the ability to proficiently describe technical products using the target language increased from 45% to 78%, whereas the control class achieved a rate of merely 52%. The frequency of errors committed in the usage of emerging-technology vocabulary—exemplified by the production of "self-repair material" in lieu of the correct form "self-repairing material"—exhibited a reduction of 32%. Furthermore, the accuracy with which participants employed complex syntactic structures—including attributive clauses and the present perfect tense—rose from 38% to 69% [6].

(2) Thinking ability: Markedly Enhanced Information Integration and Critical Thinking

During group discussions centered on the advantages of the Fuxing Hao, 90% of the students in the experimental group were capable of articulating at least two perspectives derived from distinct analytical dimensions—such as technological innovation and social value—while substantiating their arguments with empirical data (e.g., an operational speed of 350 km/h). In contrast, only 55% of the students in the control group attained this level of performance.

(3) Professional literacy: Deep integration of English learning and vocational skills Combined with the demands of accounting majors, in the teaching of "English for intelligent office systems", students in the experimental class simulate dialogues of intelligent financial data analysis in virtual scenarios (e.g., "Can you show me how to generate a financial report?"), linking English learning with post skills. Enterprise surveys indicate that 82% of employers believe students from the experimental class are more competent in technical English communication for job requirements.

3.2 Practical Reflection: Challenges and Improvement Directions of Technology Empowerment

Although artificial intelligence injects new momentum into classroom transformation, several problems remain to be addressed in practice.

(1) Technology appropriateness: Tool operation needs to be more "teaching-friendly" The operation process of some intelligent systems is relatively complicated, leading to imbalanced allocation of classroom time (e.g., the intelligent scenario creation session overran by 10 minutes). In the future, educational-oriented design of intelligent tools should be strengthened to simplify operation interfaces and develop one-click teaching functions.

(2) Data privacy: Security Guarantee of Students' Learning Data Needs ReinforcementStudents' learning data—such as voice records and assignment trails—raises privacy concerns, as the encryption mechanisms that current platforms employ still require further improvement. It is recommended that blockchain technology be introduced so that a storage system which separates data ownership, usage right, and management right can be established, thereby ensuring that data is used

only within the authorized scope.

(3) Teachers' role: Transition from "technology user" to "intelligent facilitator" Some teachers lack competence in integrating AI technology and tend to apply technology for technology's sake (e.g., blindly pushing intelligent scenarios without designing supporting questions). Future teacher training should be enhanced, focusing on improving the ability of integrated design of technology, teaching and students, helping teachers become designers of intelligent tools, facilitators of learning processes and supporters of personalized guidance [7].

4. Conclusion

In English classrooms of vocational education, the in-depth application of artificial intelligence carries transformative potential. Through full-process renovation including pre-class intelligent diagnosis, in-class interactive teaching and after-class personalized feedback, it effectively addresses pain points of traditional classrooms: vague learning profiles, homogenized resources and insufficient personalization, and realizes the leap from "technology-supported learning" to "technology-empowered learning". We should strengthen the scenario-based connection between "technology and profession," transform authentic job tasks into classroom teaching vehicles, and promote the two-way integration of theoretical knowledge and on-the-job practice [8].

In the future, with further development of technologies such as natural language processing and affective computing, English classrooms in vocational education should deepen the integration of technology and teaching. On the one hand, build a student-centered intelligent learning ecosystem, monitor students' emotional states through affective recognition technology and dynamically adjust teaching strategies. [9] On the other hand, strengthen scenario links between technology and occupations, and develop more intelligent teaching resources matching major requirements (e.g., English for intelligent accounting office, English for automobile maintenance technology), helping students achieve dual improvement of linguistic competence and vocational skills. Only in this way can we cultivate high-quality technical and skilled talents with an international vision and professional competitiveness, consolidate the talent foundation for industrial digital and intelligent upgrading, and provide solid talent support for the transformation from "Made in China" to "Smart Manufacturing in China" [10].

As a teacher of public English courses, I will commit myself to frontline English classroom instruction and make contributions to fostering high-skilled talents. Relying on artificial intelligence technology, vocational English classrooms can break the boundaries of traditional teaching and realize the transformation from knowledge indoctrination to competence cultivation. The practice of the lesson "New Technologies in Everyday Life" shows that AI can accurately match the language foundation of vocational school students and create authentic English communication scenarios tailored to workplace contexts. In class, artificial intelligence provides strong support for differentiated instruction, instant feedback and personalized practice, which effectively stimulates students' willingness to express themselves in English. This transformation is not a simple replacement of classrooms by technology. Instead, it reshapes the roles of teachers and students empowered by technology and focuses on fostering vocational English application competence. Continuing to explore the in-depth integration of AI and curriculum content will open up more feasible paths for the high-quality development of English teaching in vocational education.

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