

An Exploration of Paths and Strategies for Bridging In-Class and Out-of-Class Learning in Primary School English Holistic Unit Teaching Empowered by Artificial Intelligence

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ABSTRACT

Under the background of the new curriculum standards, holistic unit teaching in primary school English faces bottlenecks such as poor connectivity between in-class and out-of-class learning and lagged diagnostic assessments of students' learning status. This paper explores the theoretical logic of AI-assisted holistic unit teaching in primary school English, constructs an integrated in-class and out-of-class path covering "pre-unit guidance with precise diagnosis, in-unit convergence with intelligent reconstruction, and post-unit extension with practical application," and proposes specific strategies combined with practical cases. The study shows that the integration of AI technology helps break spatial-temporal constraints, promote multidimensional interaction, and facilitate personalized teaching, aiming to provide references for primary school English teachers to optimize digital and intelligent instruction.

KEYWORDS

Artificial Intelligence; Primary school English; Holistic unit teaching; In-Class and Out-of-Class connection; Core literacy.

1. INTRODUCTION

With the promulgation of the *English Curriculum Standards for Compulsory Education (2022 Edition)* (hereinafter referred to as the *New Curriculum Standards*), the core direction of English curriculum reform has shifted toward cultivating students' core literacy. The *New Curriculum Standards* advocate that teachers should uphold the concept of holistic unit teaching, using unit themes as threads to integrate curriculum resources and reorganize teaching content, thereby guiding students to conduct inquiry-based learning within complete contexts ^[1]. However, in traditional primary school English unit teaching practice, the disconnection between in-class and out-of-class learning remains widespread. Due to the lack of stable and intelligent interactive vehicles, students outside the 40-minute classroom are often in an isolated learning state lacking authentic contextual support, making it difficult to achieve deep transfer of unit knowledge and the transformation of core literacy.

Concurrently, a wave of educational digitalization is sweeping through, with policies such as the *Education Informatics 2.0 Action Plan* explicitly calling for the deep integration of Artificial Intelligence (AI) technology with teaching and learning ^[2]. The increasing maturity of technologies such as Generative Artificial Intelligence (GenAI), Virtual Reality (VR), big data analytics, and intelligent speech evaluation provides technical empowerment for primary school English holistic unit teaching ^[3]. AI serves not only as a classroom auxiliary tool but also possesses systematic functions to connect in-class and out-of-class spatial-temporal dimensions, reconstruct teaching processes, dynamically diagnose learning conditions, and generate personalized resources ^[4].

Currently, most studies on "AI + English Teaching" still lean toward designing single classroom activities or introducing individual teaching tools, lacking systematic research from the macro perspective of holistic units and the micro path of in-class and out-of-class integration. Based on this, this study attempts to explore how to leverage AI technology to construct a teaching path that connects in-class and out-of-class learning for primary school English holistic units, aiming to achieve a leap from knowledge transmission to literacy cultivation.

2. THEORETICAL LOGIC AND CORE VALUE OF AI-ASSISTED PRIMARY SCHOOL ENGLISH HOLISTIC UNIT TEACHING

Integrating AI into primary school English holistic unit teaching is not a simple superposition of technology, but a deep integration based on Connectivism Learning Theory, Constructivism Learning Theory, and Backward Design principles. Its core value is mainly reflected in the following three dimensions.

2.1 Promoting the Structural Integration of Fragmented Knowledge

In traditional English teaching, vocabulary, sentence patterns, and discourse are often fragmented, leading to situations where students have nothing to say or mechanically apply rules when facing real communicative situations. Holistic unit teaching emphasizes systematic construction around thematic meaning^[5]. Through large language models and semantic networks, AI technology can assist teachers in efficiently collecting, organizing, and reconstructing massive digital teaching resources, embedding scattered language points into a unified thematic framework. For example, using GenAI technology, teachers can quickly generate step-by-step reading materials or audio-visual resources with clear structures and rigorous logic according to unit themes, helping students form a structural understanding of unit theme knowledge before, during, and after class^[6].

2.2 Constructing a Continuous Learning Field Extending In and Out of Class

The implementation cycle of holistic unit teaching is long, often requiring several class hours or even weeks. If learning behaviors are confined to the classroom, students' exploration of thematic meaning will be intermittent. AI's greatest advantage lies in its ability to "bridge in-class and out-of-class space and time," breaking through the walls of the school^[7]. Through platforms such as online intelligent platforms, AI virtual learning companions, and virtual simulation scenarios, students can still enter AI-constructed thematic contexts for autonomous exploration, remote collaboration, and oral communication after leaving the physical classroom. This seamless connection ensures the temporal continuity and spatial extension of holistic unit teaching.

2.3 Realizing Personalized and Precise Learning Guidance According to Aptitude

Under the traditional class-based teaching system, it is difficult for teachers to provide immediate, one-on-one feedback to the differentiated needs of dozens of students after class. As a result, homework often becomes a mere formality and fails to support the achievement of deep unit goals. Relying on big data collection and intelligent algorithms, AI technology can automatically record and analyze students' whole-process performance in pre-class preparation, in-class interaction, and post-class practice, generating objective and fine-grained dynamic learning profiles^[8]. This not only enables teachers to shift from experience-driven lesson preparation to data-driven scientific decision-making but also allows the system to automatically push personalized, tiered learning resources based on students' weak areas, realizing true individualized instruction.

3. SYSTEM ARCHITECTURE OF AI-ASSISTED UNIT TEACHING FROM THE PERSPECTIVE OF IN-CLASS AND OUT-OF-CLASS INTEGRATION

To enable AI technology to play a systematic role in holistic unit teaching, this study constructs a closed-loop interconnected teaching system architecture covering "pre-class, in-class, and post-class" stages (see Figure 1). Centering on the thematic meaning of the unit and guided by core literacy, this architecture deeply integrates pre-class preview diagnosis, in-class inquiry reconstruction, and post-class transfer application via AI technology.

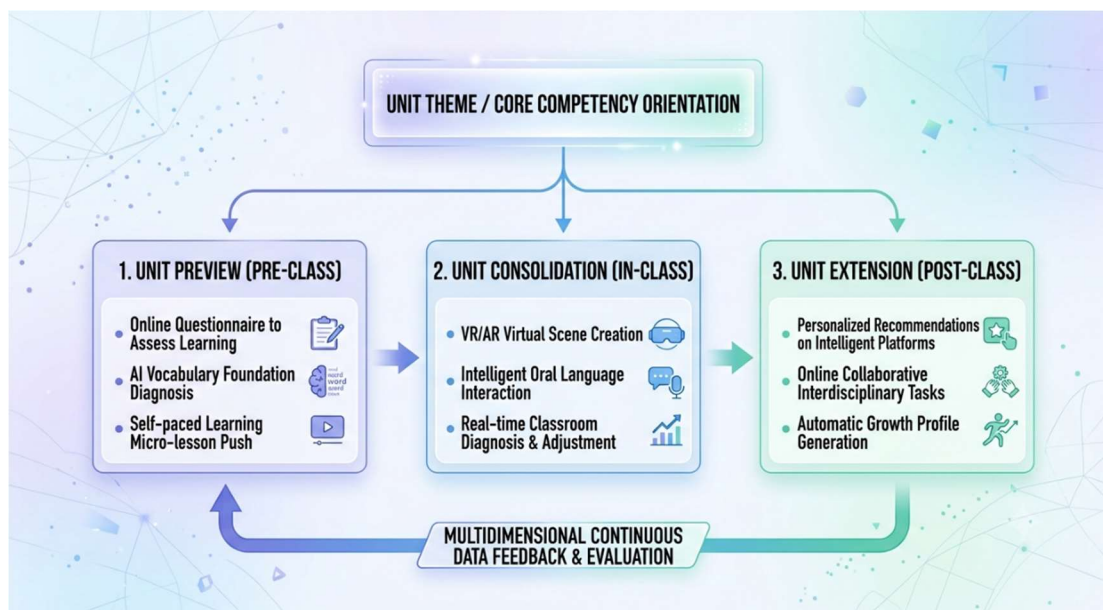


Figure 1. System Architecture of AI-Assisted Unit Teaching

In the operational flow of the entire system architecture, the pre-unit guidance stage serves as the logical starting point, mainly relying on AI platforms to act as a "diagnostician" and "resource library." Through pre-positioned intelligent evaluations and interactive Q&A, the system can precisely capture students' weaknesses in vocabulary, sentence structures, and cultural background knowledge, automatically generating visual learning data. This helps teachers reconstruct unit learning objectives and pushes adaptive preview resources to students, initially stimulating their autonomous learning awareness.

Subsequently, teaching enters the in-unit convergence stage, which is the crucial hub for knowledge internalization and literacy generation. In this stage, AI technology primarily acts as a context creator and interactive medium. Through technologies like VR/AR and generative conversational AI agents, traditional static paper textbooks are reconstructed into dynamic, multidimensional language experience fields. Students engage in high-frequency, two-way interactions (human-to-human and human-to-machine) in immersive, authentic communication, completing a deep construction of unit thematic meaning while solving practical problems.

Finally, the post-unit extension stage serves as the arena for transferring and testing teaching effectiveness. Here, the AI system transforms into a "personalized tutor" and "evaluation feedback terminal." It not only pushes progressive, tiered smart homework based on students' classroom performance differences but also supports the implementation of cross-disciplinary, cross-spatiotemporal online collaboration projects. Simultaneously, through full-process data tracking, the system conducts multidimensional process evaluations of students' language ability, thinking quality,

and cultural awareness, ultimately forming an integrated, closed-loop in-class and out-of-class path of "diagnosis-reconstruction-transfer-re-evaluation."

4. SPECIFIC PRACTICAL STRATEGIES FOR AI-ASSISTED PRIMARY SCHOOL ENGLISH HOLISTIC UNIT TEACHING

To further clarify the implementation paths of the aforementioned architecture, this study explores AI empowerment strategies across pre-, in-, and post-unit phases, combining specific units from current primary school English textbooks such as the Yilin Edition and the Beijing Normal University (BNU) Edition.

4.1 Pre-Unit Guidance: Based on Big Data Learning Diagnosis and Personalized Resource Pushing

Traditional unit teaching designs often rely on teachers' empirical judgment, lacking accurate understanding of students' existing cognitive backgrounds, interest preferences, and knowledge reserves. This easily leads to a misalignment between teaching objectives and actual learning conditions at the start of a unit ^[9]. To address this issue, teachers can design pre-unit inquiry tasks using digital platforms and AI diagnostic tools before launching a new unit.

Taking Unit 1 *More about me* of the BNU Edition (Grade 3, Volume 2) as an example, the core objective of this unit is to enable students to master vocabulary related to personal information and introduce themselves in English. Before starting the unit, teachers can release an AI-generated micro-survey on a smart platform to assess students' pronunciation proficiency in 26 English letters and their cognition of basic adjectives (e.g., *tall*, *short*, *happy*). Within a short time, the AI backend automatically calculates data and generates a visual analysis report, alerting teachers to which students struggle with abstract adjectives. Consequently, in subsequent unit goal settings, vocabulary spelling and intuitive context construction can be established as primary breakthrough points ^[10].

Since primary school students have not yet developed complete autonomous learning habits, traditional pre-class previews often vary in quality. Introducing an AI adaptive pushing system can improve this situation. Teachers can utilize GenAI technology to re-develop difficult vocabulary lacking phonetic symbols or pronunciation guidance in textbooks, recording them into engaging micro-courses. For example, by uploading AI-generated cartoon character voiceover videos to the smart teaching platform, the platform will push preview micro-lessons of varying difficulty based on students' performance in pre-tests. After students complete video viewing and matching word puzzle games online, the system retrieves real-time data, enabling teachers to scientifically plan the allocation of key and difficult points for the first class hour.

4.2 In-Unit Convergence: Intelligent Context Reconstruction and Two-Way Interactive Classroom Building

The in-class stage is the main battlefield of holistic unit teaching. Traditional classroom interaction often follows a linear model where the teacher asks questions and individual students answer, making it difficult for all students to receive sufficient oral communication training within limited time. Moreover, static illustrations in textbooks restrict students' comprehension of complex contexts. AI technology can break the static limitations of textbooks, transforming abstract language knowledge into high-fidelity, interactive, immersive scenes.

In the holistic unit teaching of Unit 6 *On the farm* of the Yilin Edition (Grade 3, Volume 2), an important lesson involves exploring farm animals and fruits. Teachers can build a panoramic digital farm in the classroom using Virtual Reality (VR) technology. Wearing lightweight VR headsets, students feel as if they are standing in farmland. By inputting commands into the system backend, the

AI system renders real-time scenes of rabbits eating carrots and ducks swimming in ponds. Accompanied by realistic natural sound effects, the teacher guides students into exploratory conversations. By asking about the vegetables and animals before them, students naturally use core sentence patterns like "They are carrots" under multi-sensory stimulation. In such highly immersive scenes, English learning is no longer rote memorization, but an authentic construction accompanied by physiological sensory experiences.

To expand students' oral output coverage in class, the introduction of AI agents is particularly critical. In teaching Unit 1 *Family* of the BNU Edition (Grade 3, Volume 1), students are required to attempt simple self-introductions and family member introductions. Teachers can activate AI voice interaction tools in smart classrooms, allowing students to simulate dialogues with AI characters in groups. When a student says, "This is my father. He is a policeman," the AI assistant responds immediately and asks follow-up questions, forming a two-way interaction. During this process, the AI system not only converts students' voice input into text on screen in real time but also uses Natural Language Processing (NLP) technology to automatically highlight pronunciation flaws or grammatical errors (such as omitting third-person singular or misusing articles). Teachers act as guides and evaluators, encouraging students to observe, analyze, and self-correct the highlighted content, greatly boosting student participation enthusiasm.

4.3 Post-Unit Extension: Intelligent Collaboration Platforms and Multidimensional Data-Driven Diagnostic Evaluation

The post-class stage is the touchstone for the effectiveness of holistic unit teaching. How to avoid mechanical, repetitive copying homework and guide students to apply what they have learned in authentic interdisciplinary or real-life practices is the top priority of post-class design.

Take Unit 3 *Our animal friends* of the Yilin Edition (Grade 5, Volume 1) as an example. After completing the unit, the AI backend automatically pushes three tiers of post-class homework based on students' classroom performance data. For foundation-level students with unstable mastery of vocabulary and sentence patterns, the system pushes fun games focusing on sound-shape connections. For intermediate-level students, it pushes short animal science readings requiring error correction or basic reading comprehension tasks. For advanced students with capacity for extension, it requires writing micro-diaries about animal friends and guides them to use AI writing assistants to polish and upgrade vocabulary richness and sentence diversity autonomously, realizing intelligent customization of tiered homework.

The *New Curriculum Standards* emphasize designing interdisciplinary thematic learning activities, encouraging students to solve practical problems through cooperation. Taking the *Seasons* unit in Grade 6 Volume 1 as an example, teachers can design an interdisciplinary project task titled "Creating a Four-Seasons Science Weather Chart," integrating knowledge from science, art, and mathematics. Since this project cannot be completed independently within limited class time, teachers can guide students to use online collaboration platforms for remote cooperation. Team members co-draft practice plans online, use AI image tools to generate seasonal landscape paintings, and write climatic characteristics for each season in English. Teachers can review group progress and interaction logs at any time on the teacher backend of the collaboration platform, providing timely online guidance. This online collaboration spanning time and space allows English learning to truly integrate with students' daily lives and scientific inquiry.

Furthermore, AI integration provides crucial data support for establishing an evaluation system that combines summative and process assessment. Teachers can collect performance data throughout the unit learning cycle using customized AI evaluation software. In the unit presentation class (e.g., a poster presentation themed *Numbers in life*), after students upload their works, the AI system automatically generates a preliminary radar chart analysis based on dimensions such as English expression standardization, sentence logic, and presentation pronunciation. This provides objective

data references for teachers to write process-oriented comments and formulate personalized growth suggestions.

5. REFLECTIONS AND CHALLENGES OF AI-ASSISTED PRIMARY SCHOOL ENGLISH HOLISTIC UNIT TEACHING

Although artificial intelligence demonstrates significant advantages in breaking down in-class and out-of-class barriers and empowering primary school English unit teaching, several practical challenges remain during routine promotion, requiring a rational and prudent attitude in practice.

5.1 Selection of Technological Tools Must Adhere to Adaptability and Moderation Principles

In teaching practice, some teachers easily fall into the trap of technology supremacy, piling up flashy AI presentation tools in the classroom while ignoring the essential requirements of teaching objectives. This study posits that AI application in classrooms must be moderate and suitable. Teachers should selectively integrate technology according to unit theme characteristics. For instance, life and nature topics are suitable for VR contexts, whereas reading, writing, and critical thinking themes are better suited for AI grading and smart writing tools. Technology integration should serve the achievement of teaching goals rather than becoming a mere formality.

5.2 Teachers' Digital and Intelligent Literacy Faces Severe Tests

The realization of AI empowerment highly depends on teachers' proficiency in operating various smart teaching tools (e.g., data analysis systems, post-class collaboration software, prompt engineering design). This requires schools and education departments to establish long-term "AI + Education" special training mechanisms to help English teachers cross the technical gap between technology dividends and practical application, improving teachers' digital agility to precisely adjust teaching strategies based on data.

5.3 Guarding Against Emotional Absence in Technology Application

Foreign language teaching is not only a process of acquiring language symbols but is also rich in humanistic exchange and emotional interaction. AI assistants and smart platforms can provide objective grammar judgments and scores, but they cannot offer students warm visual encouragement, face-to-face empathetic communication, or spiritual inspiration. Therefore, in holistic unit teaching, teachers must always remember their core role as emotional scaffolds and value guides, adhering to the bottom line of human-machine collaboration and human-centered teaching integration, ensuring the organic unity of technological warmth and humanistic care.

6. CONCLUSION

In summary, in core literacy-oriented primary school English holistic unit teaching, the deep integration of AI technology can inject new vitality into traditional teaching models. By scientifically constructing an integrated in-class and out-of-class path featuring "pre-unit guidance, in-unit convergence, and post-unit extension," it is expected to alleviate real pain points in traditional teaching, such as smooth connection failures between in-class and out-of-class learning, inaccurate learning condition analyses, and a lack of personalized resources, thereby expanding students' language practice space and time. However, technology is ultimately a means, not an end. In future teaching explorations, primary school English teachers should base themselves on the essential nature of subject education, continuously improve their digital literacy, and use AI cleverly and

appropriately to build a more vibrant, personalized, and systematic new ecosystem for primary school English holistic unit teaching.

REFERENCES

- [1] Huang, R. Y. (2024). Analysis of primary school English teaching strategies based on artificial intelligence. *Campus English*, (12), 33–35.
- [2] Zhao, J. (2025). Innovative practice of primary school English reading teaching under the background of artificial intelligence. *Digital and Intelligent Teaching*, (10), 193–195.
- [3] Liu, F. (2024). Ingeniously combining artificial intelligence teaching to promote quality and efficiency enhancement in primary school English. *Primary School Student (Second Half of the Month)*, (12), 112–114.
- [4] Wu, H. L. (2026). Research on strategies for generative artificial intelligence empowering primary school English reading and writing teaching. *New Education*, (06), 12–14.
- [5] Zhang, J. L. (2026). The path of primary school English holistic unit teaching under the guidance of core literacy. *Primary School Student*, (04), 28–30.
- [6] Cheng, H. F. (2026). Exploration of paths for artificial intelligence empowering primary school English teaching. *Educational Practice and Research*, (13), 25–27.
- [7] Zhang, Q. (2026). Integration strategies of artificial intelligence technology and primary school English teaching. *Teacher Development*, (01), 67–69.
- [8] Yan, M. F. (2025). Integration strategies of primary school English holistic unit teaching based on core literacy. *Huaxia Teacher*, (33), 102–104.
- [9] Wang, J. Z. (2024). Primary school English unit holistic teaching from the perspective of deep learning. *Journal of Teaching and Management*, (26), 52–55.
- [10] Cai, B. B. (2024). Primary school English unit holistic teaching strategies guided by thematic meaning. *Asia-Pacific Education*, (05), 146–148.