Practical Research on AI-Empowered High School History Teaching

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Abstract: With the rapid advancement of artificial intelligence (AI) technology, high school history teaching is undergoing a profound and unprecedented transformation. The *2024 Artificial Intelligence Index Report* published by Stanford University indicates that AI applications in education are expanding steadily, with an increasing number of educational institutions adopting AI to optimize teaching processes and enhance instructional effectiveness. Grounded in the current context and practical demands of AI integration in education, this study examines practical cases of AI-empowered high school history teaching, systematically analyzing its application scenarios, implementation pathways, and actual outcomes. Furthermore, this paper critically reflects on the challenges currently facing AI integration in high school history teaching and proposes actionable recommendations for future development, aiming to provide insights for advancing the digital transformation and intelligent upgrading of history education.

Keywords: Artificial intelligence; High school history; Teaching practice; Teaching model; Human-machine collaboration; Core competencies

1. Introduction

In the contemporary educational landscape, the deep integration of artificial intelligence (AI) and education has become a crucial force driving educational reform. As a discipline essential to cultivating students' humanistic literacy, historical thinking, and value orientation, history education often encounters limitations under traditional teaching models—such as overreliance on lecture-based instruction, monotonous presentation of historical materials, and the vast temporal and spatial scope of content—which hinder students' comprehension and engagement. However, emerging technologies such as generative AI and virtual simulation offer innovative solutions to these challenges [1]. The *Outline for the Construction of an Education Power (2024–2035)* explicitly emphasizes the strategic goal of "leveraging artificial intelligence to advance educational transformation," signifying that AI-enhanced instruction has evolved from an optional tool to a fundamental component of modern education. Specifically within high school history teaching, AI applications are transitioning from peripheral support to core integration, progressing from mere instrumental use to the reconfiguration of pedagogical models, thereby enabling a qualitative leap in history education in the era of intelligence.

2. Application scenarios of AI-empowered high school history teaching

2.1. Reconstruction of historical scenarios and cross-temporal dialogue

The primary challenge in history teaching lies in enabling students to comprehend past figures and events that no longer exist. AI technology effectively bridges the temporal and spatial gaps through methods such as digital character generation, scene simulation, and virtual conversations, creating an immersive learning experience [2].

For instance, when teaching the unit on the "Hundred Schools of Thought," AI can be employed to bring pre-Qin philosophers out of textbooks by reconstructing their appearances, voices, and linguistic styles, facilitating direct dialogue across millennia. A student may ask "Confucius": "Is 'Ren'—benevolence, defined as loving others and practicing moral virtue—still relevant in today's highly competitive society?" To which "Confucius" could respond: "Ren" is not merely a moral ideal but a synthesis of inner spiritual cultivation and outward ethical conduct. It emphasizes mutual care, respect, and tolerance among individuals and advocates a way of life guided by kindness and integrity. Moreover, it encourages individuals to pursue self-fulfillment while supporting the growth and dignity of others [3]. Such cross-temporal interactions enable students to engage with history in a personal and meaningful way, significantly enhancing classroom participation and stimulating intrinsic motivation for learning.

2.2. Visualizing complex systems and abstract concepts

Teaching institutional history often presents challenges due to intricate structural relationships and abstract theoretical constructs. AI technology addresses this through dynamic visualizations, relational animations, and interactive simulation systems, transforming abstract concepts into tangible, perceptible, and intellectually stimulating experiences.

For instance, in the lesson titled "Changes and Innovations in the Systems of the Sui and Tang Dynasties," AI was employed to convert the historical evolution of the official selection system into a dynamic visual framework. Through systematic case analysis, the limitations of the selection mechanisms across different periods were identified, and the underlying causes driving their transformation were explored. Subsequently, the structural advantages of the imperial examination system and the socio-political factors contributing to its longevity—over one thousand years—were elucidated. In addition, historical scenarios could be simulated by generating character dialogues and historical animations. Reproduce the operational procedures of the selection system for officials and the drawbacks that existed in different periods [4]. This enables them to intuitively understand the internal logic of the development and evolution of the selection system. It is crucial to emphasize that AI does not supplant teacher-led explanations. Rather, it serves as a cognitive tool that visualizes complex institutional dynamics, thereby supporting students in comprehending the systemic logic of historical change.

2.3. Personalized learning and adaptive assessment

Traditional history instruction often struggles to accommodate individual differences in student aptitude and learning needs. In contrast, AI technology enables the design of personalized learning pathways and adaptive assessments through the real-time collection and analysis of student learning data.

By leveraging students' academic backgrounds, cognitive profiles, and interest preferences, AI systems can generate tailored instructional strategies. For example, for students with strengths in the social sciences, the system can produce interactive materials such as "historical drama clips integrated with literary analysis," for those inclined toward natural sciences, it can create comparative visualizations such as "data-driven representations combined with the history of science and technology," and for art-oriented learners, immersive resources like "artworks contextualized within their historical periods" can be developed [5]. This highly

differentiated instructional approach transforms abstract historical concepts into contextually relevant "living textbooks" aligned with students' disciplinary interests, thereby enhancing engagement and positioning students as active participants in their learning.

During the assessment phase, AI facilitates the automatic generation of personalized error logs and enables cross-grade dynamic tracking, effectively constructing an evolving academic profile for each learner. This function parallels Portfolio-based Assessment by systematically collecting process-oriented data to identify and address learning gaps in a timely and targeted manner. Moreover, it mitigates the limitations of traditional Summative Evaluation by emphasizing continuous, formative assessment. By the time students reach their final year of high school and begin preparing for college entrance examinations, their longitudinal learning trajectories become clearly visible, allowing educators to implement precise interventions to address knowledge deficiencies. This data-driven approach to assessment significantly enhances evaluation accuracy and overcomes the subjectivity inherent in conventional teaching practices that rely heavily on instructor experience.

3. Practical case of AI-empowered high school history teaching

Since 2025, numerous practical explorations of AI-empowered high school history teaching have been conducted nationwide, generating a wealth of valuable cases that vividly demonstrate the tangible effectiveness of AI technologies in secondary history classrooms.

3.1. AI facilitates the articulation between junior and senior high school history teaching

In addressing the articulation from junior to senior high school history education, AI exhibits unique potential. For instance, when introducing Lesson 9, "The Politics and Military Affairs of the Two Song Dynasties," in Outline of Chinese and Foreign History (Part 1), virtual reality (VR) and augmented reality (AR) can be employed to construct immersive historical scenarios featuring Zhao Kuangyin and Zhao Pu [6]. By highlighting their dialogue on governance strategies, students are enabled to experience historical events firsthand. This approach not only serves as an engaging lesson opener but also stimulates critical thinking, facilitates the review of prior knowledge acquired in junior high school, reduces cognitive load, and effectively enhances student interest and engagement, thereby promoting a smoother teaching process.

3.2. AI-guided historical evidence-based teaching

Similarly, VR and AR technologies can support evidence-based historical inquiry. In learning Lesson 14, "Various Vehicles of Cultural Transmission and Their Development" in "Cultural Exchange and Communication," educators can develop a "Virtual Museum of the Forbidden City." Through VR devices, students can virtually enter the Forbidden City, explore its palaces, and examine its architectural styles, historical evolution, and associated events and figures. Within this interactive environment, students may engage with virtual historical personas—such as conversing with Emperor Qianlong—to learn about the relevant historical facts of the compilation of the Four Treasuries. Such experiential interactions deepen comprehension and strengthen retention of historical content.

3.3. AI-supported project-based learning and theme-based teaching

AI technology also offers robust support for project-based learning and thematic instruction in high school history. Features such as intelligent scenario generation, feasibility prediction, dynamic tracking, personalized intervention, multi-dimensional assessment indicators, and automated data analysis enhance instructional design

and delivery. Notably, the AI-driven creation of immersive historical simulations and optimization of classroom interaction strategies significantly facilitate teaching implementation. Through project-oriented tasks grounded in real-world contexts, students develop competencies in historical inquiry, problem-solving, and collaborative innovation. This approach aligns with the pedagogical goal of leveraging technology to cultivate students' accurate historical perspectives and humanistic literacy, achieving both improved teaching efficiency and deeper educational value.

4. AI-empowered high school history teaching: The challenges and reflections

Despite its promising outcomes and broad potential, AI-integrated history education faces multifaceted challenges in practice, warranting careful reflection and proactive solutions.

4.1. Balancing technological dependence and historical authenticity

While AI-generated content is often engaging and visually compelling, its historical accuracy must be rigorously evaluated. When using AI tools to generate historical scenes or character dialogues, teachers must ensure fidelity to documented facts, avoiding excessive fictionalization or entertainment-driven distortions [7]. The integration of AI in history education should adhere to the principle of "teacher-led, student-centered, technology-empowered." As primary designers of instruction, teachers bear the responsibility of critically reviewing AI-generated materials to ensure alignment with historical truth and educational values. Particularly regarding sensitive topics or contested historical interpretations, AI should function solely as a supplementary tool, never replacing the essential role of teacher-led value guidance.

4.2. Advancing teachers' AI competence and pedagogical mindset

The effectiveness of AI-empowered history teaching largely depends on the proficiency level of teachers' AI skills and the degree of renewal of their teaching philosophies. Currently, there are still some history teachers who have a limited understanding of AI technology and are unable to effectively integrate it into their teaching practices. Therefore, we should continue to hold regular training courses for teachers on AI skills, focusing on "practical operation of common tools + subject-appropriate methods," launching micro-lessons on "AI historical document retrieval techniques," establishing learning groups on "AI ethics and history teaching," and holding case seminars to address pain points such as "AI-generated fake historical documents" and "students' excessive reliance on AI." We should also organize discussion sessions on "principles of three reviews of historical documents" and "AI assistance + original requirements" as solutions [8]. It is particularly important to emphasize that teachers not only master the basic operations of AI tools but also understand the educational principles behind them. Only in this way can they better achieve the in-depth integration of technology and teaching.

4.3. Disparities in resource construction and technology adoption

Significant disparities exist in the development of information infrastructure and AI educational resources across regions and schools, potentially exacerbating existing educational inequalities. Schools in economically developed areas can afford substantial investments in advanced AI-powered teaching platforms, whereas those in rural or underdeveloped regions often struggle to access even basic digital resources. To mitigate this imbalance, establishing a resource-sharing mechanism among well-equipped and less-resourced schools is essential. Strengthening collaborative efforts in developing AI-enhanced history teaching materials and jointly designing project-based learning curricula can foster equitable access. Such regional cooperation models

contribute to narrowing the educational gap and promoting balanced development in AI-empowered history education.

5. AI-empowered high school history teaching: The future outlook

Building on current practices and challenges, the future of AI-empowered high school history teaching is likely to develop in the following directions.

5.1. Deep integration of multiple intelligent technologies

Future AI-enhanced history instruction will transcend reliance on isolated technologies by integrating multiple intelligent tools—such as VR, AR, 3D printing, and big data analytics—to deliver immersive, multi-sensory learning experiences [9]. In topics involving archaeological sites or historical artifacts, for instance, students can use VR to virtually enter reconstructed historical scenarios, interact with 3D-printed replicas of ancient objects, and employ AR to visualize the internal structures of historical buildings. The integration of these technologies makes it possible to fully engage in history classroom teaching activities through visual, tactile, and spatial interactions, thereby deepening understanding and memory.

5.2. Human-machine collaborative intelligent teaching models

A triadic instructional framework of "teacher + artificial intelligence + student" is anticipated to become central in future history classrooms, establishing a new paradigm of intelligent teaching grounded in human-machine collaboration. Unlike traditional teacher-student dyads, this model leverages AI to support real-time interaction: students express perspectives via word clouds, complete in-class assessments using electronic learning devices, and engage in personalized, adaptive learning activities. Under this model, teachers focus on curriculum design, emotional guidance, and value cultivation, while AI assumes responsibilities such as knowledge delivery, individualized tutoring, and formative assessment. As a result, students transition from passive recipients to active investigators and creators, fostering autonomy, critical thinking, and collaborative inquiry.

5.3. Data-driven, precise evaluation system

Leveraging AI's capabilities in data collection and analysis, future history education will implement data-driven evaluation systems that shift assessment from outcome-based to process-oriented, and from group-level to individualized evaluation. By capturing diverse learning indicators—such as duration of video engagement, patterns of interactive responses, quality of AI-mediated dialogues, and completeness of project tasks—AI systems can construct detailed profiles of students' historical competencies. These profiles enable accurate identification of cognitive traits and learning difficulties of students, providing actionable data support for instructional adjustments [10]. Importantly, such systems emphasize not only mastery of factual content but also the development of historical thinking and core disciplinary competencies.

6. Conclusion

AI-empowered high school history teaching represents a profound transformation. It addresses numerous challenges in history teaching through technological means, driving innovation in teaching models and improvement in teaching efficiency. In the process of advancing AI-empowered high school history teaching, we should continuously and deeply explore better pathways for AI to empower high school history teaching.

Only through sustained reflection and refinement can AI transcend its role as a mere technical tool and emerge as a driving force in educational transformation—one that cultivates learners equipped with historical consciousness, humanistic literacy, and innovative capacities for the new era.

Disclosure statement

The author declares no conflict of interest.

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