

A Practical Study on AI-Enabled Classroom Teaching of Critical Thinking in Senior High School English

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Abstract: The *General High School English Curriculum Standards (2017 Edition, Revised in 2020)* incorporates critical thinking into the core competencies. However, current senior high school English teaching faces challenges such as ambiguous objectives, rigid methods, simplistic evaluation systems, and insufficient teacher capacity. This study focuses on the existing problems in critical thinking-oriented English classroom teaching at the senior high school level, analyzes the role of artificial intelligence (AI) technology in addressing these teaching dilemmas, and explores the mechanisms of AI empowerment. By examining the core bottlenecks in teaching practice, the research aims to provide theoretical references and practical guidance for optimizing senior high school English classroom teaching, enhancing students' critical thinking competencies with the support of AI, and facilitating the implementation of core competencies in English as a subject.

Keywords: Artificial intelligence; Senior high school English; Critical thinking; Classroom teaching

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1. Introduction

The *General High School English Curriculum Standards (2017 Edition, Revised in 2020)* explicitly includes critical thinking in the core competencies of English, emphasizing the cultivation of students' abilities to analyze, evaluate, and create. Nevertheless, in current senior high school English teaching, the development of critical thinking is often marginalized. Issues such as rigid teaching methods and simplistic evaluation systems hinder the improvement of students' thinking abilities^[1]. With the in-depth penetration of AI technology in education, its functions, such as data processing and personalized interaction, have provided a new approach to addressing this dilemma. This study focuses on the existing problems in critical thinking-focused English classroom teaching at the senior high school level, explores the empowered mechanisms of AI technology, and aims to offer theoretical references and practical guidance for optimizing teaching practice and enhancing students' critical thinking competencies.

2. Existing problems in critical thinking classroom teaching of senior high school English

2.1. Teaching objectives focus on knowledge transmission, with vague goals for cultivating critical thinking

In the practice of senior high school English teaching, most teachers still take the transmission of language knowledge as the core goal, and regard vocabulary memorization, grammar mastery, and sentence pattern application as the key contents of classroom teaching, lacking clear and specific goal settings for the cultivation of critical thinking^[2]. Although the *General High School English Curriculum Standards (2017 Edition, Revised in 2020)* clearly propose cultivating students' critical thinking, some teachers fail to refine this requirement into operable classroom teaching objectives. They neither design targeted thinking training tasks in combination with the thematic contents of different units, nor clarify the critical thinking level that students in different learning stages should reach. For example, in reading teaching, teachers mostly guide students to extract key information from the text and translate key sentences, but rarely require students to analyze the author's viewpoints and positions or examine the argumentative logic of the text. As a result, students have long been in a state of passively accepting knowledge, making it difficult for them to form the awareness and ability of independent thinking and critical evaluation.

2.2. Teaching methods are dominated by teacher lectures, lacking interactive designs to stimulate critical thinking

At present, senior high school English classes still generally adopt the traditional teaching method of "teacher-led, students passively accepting." Teachers unilaterally transmit knowledge through blackboard writing, PPT demonstrations, and other methods, and students have limited opportunities to participate in classroom interaction, making it difficult to fully mobilize the initiative and criticality of thinking. Although some teachers will introduce interactive forms such as group discussions and classroom Q&A, these interactive designs often lack depth and pertinence, and are difficult to effectively stimulate students' critical thinking^[3]. For example, the themes of group discussions are mostly closed-ended questions such as "What is the main content of the text?" and "What are the characteristics of the characters in the text?", with unique answers that students can reach without in-depth thinking; classroom Q&A also mostly revolves around basic knowledge, rarely involving open-ended questions such as "Do you agree with the author's point of view, and why?" and "What conclusion would be drawn if analyzed from another angle?". Such shallow interactive designs cannot provide space for students' critical thinking training, making it difficult to promote the improvement of students' thinking ability.

2.3. Teaching evaluation focuses on exam-taking ability, lacking consideration of the critical thinking process

The evaluation of senior high school English teaching still has obvious characteristics of "examination-oriented." The evaluation content mainly focuses on students' mastery of language knowledge and exam-taking skills. For example, through standardized tests such as mid-term exams and final exams, students' vocabulary, spelling accuracy, grammar application correctness, reading comprehension score rate, and language fluency of written expression are examined, while there is a lack of scientific and comprehensive evaluation of the development process and level of students' critical thinking. In the evaluation of written expression, teachers mostly pay attention to students' language errors and the completeness of text structure, and rarely evaluate the innovation of students' viewpoints, the logic of argumentation, and the depth of analysis of problems^[4]; in reading evaluation, students' ability to critically interpret texts and their ability to tolerate and reflect on different

viewpoints are not included in the evaluation scope. This single evaluation system can not only fail to fully reflect the development of students' critical thinking, but also difficult to form effective feedback on teachers' teaching behaviors, resulting in the lack of strong evaluation support and guidance for the cultivation of critical thinking in teaching practice.

3. Paths of AI-enabled classroom teaching for critical thinking in senior high school English

3.1. AI integrates multidimensional teaching resources to consolidate the foundation for critical thinking

Leveraging big data technology, AI can integrate interdisciplinary and multi-perspective teaching resources around unit themes, providing abundant material support for cultivating students' critical thinking. Taking "Unit 4 Information Technology" in Beijing Normal University Press Senior English (Required Volume 2) as an example, this unit focuses on the advantages and disadvantages of cyberspace, with the core goal of guiding students to dialectically view the impact of internet technology. AI teaching platforms can automatically screen resources matching the unit theme, including comparative reports on internet regulatory policies across different countries, case studies of typical internet rumor propagation, and abstracts of scholars' controversial papers on the "digital divide." These resources are pushed in layers following the logic of basic cognition–perspective collision–in-depth exploration^[5]. Meanwhile, AI structurally processes the resources, labeling key viewpoints and supporting evidence^[6]. For instance, a supplementary article on internet privacy protection highlights the core differences between two solutions—"technical protection" and "legal regulation"—helping students quickly grasp the logical framework of different positions. This lays a solid foundation for subsequent critical analysis and avoids the limitations of scattered resources and single perspectives in traditional teaching.

3.2. AI visualizes thinking processes to dismantle the critical logic of texts in Beijing Normal University Press textbooks

AI can visualize students' critical thinking processes regarding texts through tools like mind maps and logic trees, helping teachers and students accurately identify thinking gaps and optimization directions. Taking the reading text *Race to the Pole* from "Unit 5 Humans and Nature" in Beijing Normal University Press Senior English (Required Volume 2) as an example, this text explores the relationship between humans and nature by introducing the history and current status of polar explorers competing to conquer the North and South Poles. AI teaching systems can automatically generate a critical analysis framework for the text, with "exploration motives–process challenges–outcome impacts" as main branches, each subdivided into specific questions. For example, under "exploration motives," sub-questions such as "Were explorers driven by personal glory?" and "Did exploration consider ecological impacts?" are set; under "outcome impacts," relevant evidence like "polar environmental change data" and "indigenous peoples' living conditions" are labeled. When operating, students drag key information from the text to corresponding nodes, and the system displays the completeness of the thinking chain in real time. If a node lacks supporting arguments, the system highlights it in red and pushes relevant paragraphs or external resources for supplementation. Through the back-end data panel, teachers can intuitively observe the distribution of the whole class's performance in thinking dimensions such as "causal reasoning" and "evidence evaluation," and design targeted training for common logical flaws (e.g., over-generalization, neglect of counterexamples). This visualization tool not only helps students construct systematic critical thinking paths but also enables teachers to adjust teaching strategies promptly through dynamic feedback

mechanisms, realizing the integration of “teaching-learning-assessment”^[7].

3.3. AI provides personalized thinking guidance to adapt to the needs of layered teaching

Based on students’ academic performance data, AI can offer differentiated guidance strategies targeting the key points of critical thinking training in different units of textbooks, meeting the needs of layered teaching. Taking the writing teaching of “Unit 8 Green Living” in Beijing Normal University Press Senior English (Required Volume 3) as an example, the topic of this unit is “environmental protection” under the theme of “humans and nature.” The writing class requires students to understand the content of a survey report, master the quantity expression methods in the survey report through reading and imitating writing, learn to interpret appropriate charts, and describe the main results of the survey and supporting data. In the teaching process, AI first divides students into three levels: basic level, improvement level, and refinement level through pre-class diagnostic tests and analysis of previous assignments^[8]. For students at the basic level, who mostly have problems such as incomplete interpretation of charts and disconnection between data and conclusions, AI will push templates of campus garbage classification survey charts marked with key elements such as “sample size, proportion of core data, and trend changes,” along with sample fragments of survey reports in the textbook, guiding them to sort out the content according to the logic of “survey object–data presentation–simple conclusions.” At the same time, it will timely correct the thinking deviation of “only listing data without explaining the significance.” For example, it will prompt that “80% of students know the classification standards” needs to be supplemented with comparative data of “but only 30% can correctly classify” to support the conclusion of “disconnection between cognition and practice.”

For students at the improvement level, who can complete the framework of the survey report but are insufficient in the analysis of data relevance and the depth of conclusions, AI will push multi-dimensional comparative data, such as “garbage classification accuracy rates of different grades” and “usage rates of trash cans in different areas,” and set guiding questions: “Is the higher accuracy rate of Grade 1 compared with Grade 3 related to academic pressure and the frequency of environmental protection publicity? Please supplement the argument with data.” Meanwhile, it will retrieve extended reading materials of the “Green Living” unit in the textbook, such as “community environmental protection practice cases,” to help them enrich their analysis perspectives. For students at the refinement level, AI focuses on high-level training of critical thinking, pushes academic materials on survey methods, and guides them to reflect on the limitations of the report. For example, “The sample of this survey only covers our school. Is there a regional bias? How to adjust the sample selection range to expand the applicability of the conclusion?” It also encourages them to put forward improvement plans based on the unit theme, such as “It is suggested to add surveys in surrounding communities to compare the differences in environmental protection behaviors between students and residents.” Through this layered guidance, AI not only conforms to the writing requirements of the textbook but also enables students of different levels to gradually improve their critical thinking through appropriate training, effectively solving the problem of a lack of targeted guidance in traditional layered teaching.

3.4. AI expands cross-scenario critical practice to extend the boundaries of thinking training

AI can simulate real-life scenarios, extend critical thinking training to extracurricular practice, and realize a closed loop of “classroom learning–scenario application”^[9]. Take the character report Angela Johnson interviews ex-millionaire Jason Harley in “Unit 2 Success” of Beijing Normal University Press Senior English (Elective Volume 1) as an example. This text expresses the core idea that money is not equal to success, and

real success comes from helping others and contributing to society by introducing the deeds and views on success of the former millionaire Jason Harley. In the teaching process, students have understood the logic of Jason Harley's transformation from pursuing wealth to engaging in public welfare through text analysis in class. On this basis, AI can build an immersive simulation scenario of "career success choices," breaking the barrier between the classroom and life. First, AI generates two typical career situations based on the core ideas of the text: one is "a high-paying financial industry position with excellent salary but requiring long-term overtime, making it difficult to take part in public welfare activities," and the other is "a community public welfare service position with low salary but allowing direct participation in helping vulnerable groups and practicing the value of dedication." It guides students to make choices as "career planners" and submit the reasons for their choices on the AI platform.

After students make their initial choices, AI does not simply judge right or wrong, but pushes real cases similar to Jason Harley's experience, such as interviewing videos of other practitioners who have switched from the business field to public welfare, and materials on practical challenges faced by public welfare positions such as resource shortages, allowing students to see the trade-offs behind different choices. At the same time, AI sets dynamic scenario variables, such as "if the financial position provides a policy of 'public welfare donations deducting part of working hours'" and "if the public welfare position receives special corporate funding to increase salaries and expand service scope," requiring students to re-evaluate their choices based on the new variables and explain the basis for their thinking adjustments^[10]. In this process, AI records the trajectory of students' view changes in real time, marking whether they can dialectically analyze the relationship between "personal interests and social value" in combination with Jason Harley's view of success, so as to avoid one-sided thinking of either/or.

4. Conclusion

This study focuses on AI-enabled classroom teaching of critical thinking in senior high school English, and proposes four core paths: resource integration, thinking visualization, personalized guidance, and cross-scenario practice, combined with the practical scenarios of textbooks published by Beijing Normal University. These paths not only solve the problems in traditional teaching, such as scattered resources, implicit thinking, insufficient stratification, and weak practice, but also realize the in-depth adaptation of AI technology and teaching needs relying on the unit themes of textbooks, providing an operable, practical plan for the cultivation of critical thinking. In the future, it is necessary to further deepen the integration accuracy of AI technology and English teaching, such as optimizing the dynamic feedback function of thinking visualization tools, expanding the real scenario dimension of cross-scenario practice, and continuously promoting the teaching of critical thinking in senior high school English from "technology empowerment" to "literacy implementation," so as to help students achieve all-round development of core literacy in English.

Disclosure statement

The author declares no conflict of interest.

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