

Artificial Intelligence Technology-Enabled Reading Instruction Design for Senior High School English: A Case Study on Back to Nature

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Abstract

Against the backdrop of the General High School English Curriculum Standard (2017 Edition, Revised 2022), which emphasizes the deep integration of information technology and English teaching, exploring how artificial intelligence (AI) technology empowers English reading instruction to cultivate students' core competencies is of significant practical importance. This study takes the *Back to Nature* from the Foreign Language Teaching and Research Press senior high school English textbook as a case, and based on the activity-based approach to English learning, constructs a three-tier AI-integrated teaching model of "learning and understanding-application and practice-transfer and innovation". For the learning and understanding part, AI tools are used to create reading context, deconstruct the text, and generate mind-map frameworks, helping students grasp the comparative argumentation logic of the article. In the applying and practicing phase, AI image generation technology is employed to transform poetic images into visual comparative charts, guiding students to analyze the similarities and differences in natural concepts between Chinese and Western cultures and deepening their cross-cultural comparative thinking. In the transfer and innovation stage, AI context-creation tools are relied on to construct real-life issue context such as "the relationship between humans and nature in the digital era", where students engage in intellectual exchanges through interactive discussions. With the AI-generated evaluation forms, students can conduct self-assessments and peer evaluations, and finally facilitate their awareness of learning outcomes via generating quantitative data. The AI technology-enabled reading instruction design for senior high school English is characterized by remarkable teaching effectiveness and practical scalability, providing important reference value for promoting the in-depth implementation of core competencies in senior high school teaching.

Keywords

Artificial Intelligence Technology; Senior High School English Reading Teaching; The Activity-based Approach to English Learning; Core Competencies; The Integration of Teaching; Learning and Assessment.

1. Introduction

With the rapid development of information technology, artificial intelligence (AI) is irresistibly permeating all aspects of the education sector. From the popularization of intelligent lesson preparation systems to the promotion of personalized learning platforms, from automated homework correction to the construction of immersive teaching scenarios, the depth and breadth of its applications have shown an explosive growth trend. This technological innovation has not only changed the traditional teaching mode, but also reshaped the way teachers and students interact and the form of learning resources, injecting new momentum into the high-quality development of education.

As a programmatic document guiding senior high school English teaching, *General Senior High School English Curriculum Standards (2017 Edition, Revised in 2022)* clearly lists “promoting the in-depth integration of information technology and English courses” as an important reform direction in its curriculum philosophy. It emphasizes the use of technical means to create real and vivid language application situations, optimize the teaching process, and ultimately promote the all-round development of students’ core competencies - language ability, cultural awareness, thinking capacity, and learning ability. This requirement not only conforms to the new demands of the times for talent cultivation, but also points out the path of technical empowerment for English teaching reform[1].

In senior high school English teaching, reading teaching, as a key carrier for cultivating students’ language input ability and cultural understanding ability, its effectiveness directly affects the achievement of core competencies goals. However, current reading teaching still faces many challenges: text interpretation mostly stays at the extraction of surface information, with insufficient in-depth thinking training; cultural comparison lacks concrete support, and cross-cultural understanding remains superficial; it is difficult to take into account students’ individual differences, and the implementation of personalized guidance is challenging.

Against this background, this study takes the senior high school English text “Back to Nature” as a specific carrier, focusing on the integration path of AI technology and reading teaching. The text centers on the views of nature held by two poets from China and the West, containing rich linguistic phenomena and cultural connotations, which provides high-quality materials for in-depth learning. The study will take the three types of activities in the activity-based approach of English learning - “learning and understanding, application and practice, transfer and innovation” - as the basic path, and explore how to empower reading teaching links through AI technology. Specifically, it will deepen text deconstruction with the help of intelligent text analysis tools, visualize cultural comparison relying on image generation technology, and activate transfer thinking using situation creation tools, ultimately achieving the collaborative improvement of students’ language ability, cultural awareness, thinking capacity, and learning ability. This study not only provides an operable practical paradigm for the integration of AI and English subject teaching, but also attempts to offer new ideas and inspirations for reading teaching reform oriented by core competencies.

2. Literature Review

The application of artificial intelligence technology in the field of education has formed a multi-dimensional research pattern. From the perspective of domestic research trends, relevant explorations have shown a continuous upward trend in recent years. However, if the research scope is limited to the interdisciplinary field of “artificial intelligence and senior high school English teaching”, its development context is clearer. The research by Chen Weichao and others (2008) can be regarded as an early exploration in this field. They introduced the artificial intelligence teaching system “Xisike” into senior high school English classrooms for the first time, initiating practical attempts of technology empowering foreign language teaching[2]. In the subsequent 17 years, although research on the application of artificial intelligence in English teaching has gradually increased, limited by the level of technological development and teaching concepts, most ideas have not been fully implemented, and practical applications have mostly stayed at the level of auxiliary tools.

The launch of Chat GPT, a generative artificial intelligence tool developed by Open AI in the United States in 2022, has injected new momentum into research in this field. A group of scholars quickly focused on its teaching application value. For example, the empirical research on “ChatGPT-assisted feedback on senior high school English writing”[3] carried out by Mao Yansheng and others (2024), and the exploration on “ChatGPT empowering feedback on senior

high school English reading-based continuation writing” by Wang Yihang and others (2024), have all provided new perspectives for the in-depth integration of artificial intelligence and English teaching[4].

Research on senior high school English reading teaching shows obvious transformation characteristics. At this stage, teaching still has three limitations: in terms of teaching methods, it is dominated by teachers’ intensive lectures, and students’ passive acceptance leads to weak in-depth understanding ability; the evaluation method focuses on result-oriented tests, ignoring the tracking of thinking processes; cultural teaching stays at the level of vocabulary translation, lacking the depth of cross-cultural comparison. Under the guidance of core competencies, research emphasizes that reading teaching needs to realize the transformation from “knowledge imparting” to “literacy cultivation”. Specifically, in the dimension of language ability, it focuses on the cultivation of text deconstruction and reconstruction abilities; in the aspect of cultural awareness, it emphasizes the comparison and mutual learning between Chinese and foreign cultures; in terms of thinking capacity, it highlights the training of critical thinking and logical reasoning abilities (Ministry of Education, 2022). After the implementation of the new curriculum standards, reading teaching design based on thematic meaning exploration has become a research hotspot, but in practice, there are still problems such as formalized activities and difficulty in achieving literacy goals.

Research on the activity-based approach of English learning has gradually deepened into teaching practice. Its core connotation is to realize the coordinated development of language ability and thinking capacity through a stepped activity chain of “learning and understanding-application and practice-transfer and innovation” (Ministry of Education, 2022). The application path in reading teaching has formed a preliminary framework: the learning and understanding link focuses on the extraction and sorting of text information, the application and practice link emphasizes the internalization and application of language knowledge, and the transfer and innovation link highlights problem-solving in real situations.

To sum up, although existing research has accumulated certain achievements in the application of artificial intelligence technology, the transformation of reading teaching, and the practice of the activity-based approach, there is still a deficiency in the in-depth integration of specific lesson examples. This study takes “Back to Nature” as the carrier, focuses on the technology empowerment path of artificial intelligence in comparative reading, and attempts to explore a new mode of technology integration under the guidance of core competencies in practice, so as to fill the gap in existing research in systematic lesson example design.

3. Senior High School English Reading Teaching Design based on Artificial Intelligence Technology - A Case Study of “Back to Nature”

The following is a senior high school English reading teaching plan designed by the author(seeing table1), which is based on the activity-based approach of English learning and constructivist theory, combined with the characteristics of the text “Back to Nature” and integrated with artificial intelligence technology.

Table 1. Teaching Design

Title	Back to Nature
Unit	Book6,Unit 5 Learning from nature
Material edition	FLTRP(2019)
Grade	Grade 2 from Senior High
Time	40mins
The analysis of material	<p>What: This is a comparative argumentative essay that centers on the theme of “returning to nature” by two poets, Tao Yuanming and Henry David Thoreau, conducting comparisons and discussions from multiple perspectives. The thematic context of this article is “human and nature”, and the content of the thematic context is “human beings learning from nature”.</p> <p>Why: By comparing the striking similarities between Tao Yuanming and Thoreau, two great figures from different times and spaces, in their pursuit of returning to nature and a simple life, the essay eulogizes the spiritual value and courage embodied in them. Ultimately, it guides readers (teachers and students) to reflect on the profound enlightenment and practical significance of their choices and philosophies in solving the spiritual predicaments of modern people and pursuing a happy life. The core of the article lies in transforming the spiritual heritage of historical figures into a perspective and guidance for contemporary life.</p> <p>How: The article consists of six paragraphs, presenting a “general-specific-general” structure. The first paragraph introduces the different eras in which the two poets lived and their reverence for nature. The second and third paragraphs respectively elaborate on the backgrounds and reasons for the two poets’ return to rural life, as well as the changes in their psychological and living conditions during this process. In the fourth and fifth paragraphs, the author compares the natural images, the messages conveyed, and the writing styles in their works, with some of their poems interspersed. The sixth paragraph emphasizes the significance and social value of the two poets’ “back to nature” lifestyle. The entire article has a clear structure, progressing from the shallow to the deep, leaving readers with endless aftertastes.</p>
The analysis of students	<p>Language foundation: After studying in junior high school and the first academic year of senior high school, students have accumulated a certain vocabulary and basic grammar knowledge. They can understand relatively common words and simple sentence patterns in the article, which lays a foundation for reading this article about Tao Yuanming and Thoreau. However, some words related to cultural background, complex sentence patterns and literary expressions in the article may bring certain challenges to them.</p> <p>Cultural knowledge: Students have some understanding of Tao Yuanming in Chinese language learning, are familiar with some of his pastoral poems, and know the basic historical background of the Eastern Jin Dynasty. But they have relatively little knowledge about the social situation of the United States in the 19th century and Thoreau’s thoughts, which may affect their in-depth understanding of the content related to Thoreau.</p> <p>Thinking capacity: Senior two students are in a critical stage of transition from concrete thinking to abstract thinking, and have certain abilities of analysis, induction and comparison. They can initially sort out surface information such as the reasons for Tao Yuanming and Thoreau’s return to nature and changes in their living conditions. However, their understanding of abstract contents such as the in-depth cultural differences, philosophical thinking between the two, and the enlightenment to modern society may not be in-depth and comprehensive enough.</p> <p>Learning autonomy: Compared with senior one students, their awareness of autonomous learning has been enhanced. Some students can take the initiative to consult materials to assist in understanding the article. However, in the learning process, they may still need guidance from teachers to clarify learning goals and key points, so as to help them carry out learning activities more efficiently.</p>
Teaching objectives	<p>By the end of this lesson:</p> <ol style="list-style-type: none"> 1. Students will be able to sort out the structure of the article, accurately extract and summarize the similarities and differences between the two poets, Tao Yuanming and Thoreau. 2. Students will be able to understand the views on nature expressed in the works of the two. 3. Students will be able to form their own opinions on returning to nature.

Key and difficult points	<p>Key Points: Students will be able to accurately analyze the similarities and differences in the views on nature in the works of Tao Yuanming and Thoreau, and understand how the two expressed their respect for nature and the appeal for returning to nature through different forms (pastoral poetry/nature essays).</p> <p>Difficult Points: Students will be able to transfer the two poets' views on nature to the real world, maintain independent thinking on the value of real nature, and form personalized insights into "returning to nature".</p>		
Teaching procedures			
Teaching steps	Teacher's activity	Students' activity	Justification
Pre-reading			
Activity 1: Lead-in(2mins)	Play the AI-generated video of the pastoral life of ancient people and foreigners without showing their faces. The video is about 30 seconds long with no text description.	Watch the video, guess the content based on the information in the pictures, actively raise your hands to answer questions, and put forward your own doubts or guesses.	The suspenseful video is used to arouse students' curiosity, enabling them to enter the class with questions, enhancing their learning initiative and attention, and laying the groundwork for subsequent content.
Activity 2:Read the character profiles and sort out the information(2mins)	Guide students to read the profiles of the two poets and complete the character profile form.	Skim the profiles, extract key information to fill in the form, briefly discuss the similarities and differences within the group, and follow the teacher's guidance to focus on the commonalities, thereby clarifying the theme of the text.	Train students' ability to skim and extract information. Through comparison, help students establish a basic understanding of the characters, naturally introduce the theme of the text, ensuring a tight connection.
Activity 3(1mins) Observe the illustration in the title and infer the reasons and purposes why the poets retreated to the countryside	Display the text title "Back to Nature" along with the accompanying illustration, and ask questions.	Observe the title and illustrations, make inferences based on the existing knowledge of the characters, exchange ideas with your deskmate, and actively participate in sharing.	Cultivate students' observation ability and logical reasoning ability. Activate their thinking through discussions, enabling them to initially form thoughts on "the reasons for returning to nature" and lay the groundwork for in-depth reading.
While-reading			
Activity 4: Skim the text and sort out its structure.(4mins)	Guide students to skim the text and sort out its structure.	Students read the text for the first time and extract the structure of the article.	Train students' skimming ability and help them grasp the overall framework of the text.
Activity 5:Read the text carefully and extract the key points.(10mins)	Guide students to read the text carefully, focusing on the reasons and purposes for the two poets' return to nature. Display an AI-generated Venn diagram framework on the PPT (with Tao	Read the text paragraph by paragraph, circle the key sentences, extract information related to the reasons and purposes, fill in the Venn diagram, and ask teachers or classmates	Cultivate students' ability to capture detailed information through careful reading, and use the Venn diagram to visualize thinking, helping students clearly distinguish the characteristics of the two and deepen their understanding.

	Yuanming on the left, Thoreau on the right, and their commonalities in the middle).	for help when encountering doubts.	
Activity 6: Analyze the poems and explore the view of nature.	Analyze separately the imagery presented in the works of the two poets and the views on nature they intend to express.	Read the verses carefully, compare and analyze the perspectives and emotions in describing nature, summarize the two poets' views on nature after group discussions, and send a representative to speak.	Deepen the understanding of the characters' thoughts through poetic texts, guide students to elevate from specific content to the conceptual level, and cultivate their ability to analyze and summarize.
Post-reading			
Activity 7: Connect with reality and discuss viewpoints.	Raise a question: "Based on their different views on nature, how do you think humans should get along with nature in the digital age?"	Hold a dialogue with the two ancient figures (AI-created digital humans) and ask them how people can return to nature in today's society.	Connect the text content with real life, guide students to apply what they have learned, cultivate their critical thinking and ability to solve practical problems, and reflect the practical significance of English learning.
Activity 8: Elevate the theme and extract commonalities.	Guide students to review the experiences and viewpoints of the two poets, and ask, "Although they have different views on nature, what common pursuits do they share?" Summarize the commonalities: "Both of them pursue a simple life away from the hustle and bustle; they advocate getting close to nature and finding the true meaning of life in nature." Emphasize that this pursuit of nature and authentic life has significance that transcends eras.	Follow the teacher's guidance to think, recall what has been learned earlier, identify the commonalities between the two poets, and understand the elevation of the theme.	Help students fully grasp the spiritual core of the characters, see the commonalities amid differences, enhance the level of understanding of the text's theme, and achieve the cultivation of emotional attitudes and values.
Activity 9: Homework (1mins)	Essay Writing: Write an 80-100 word English essay titled "Nature in My Eyes". Combine your own life experiences to talk about your understanding of nature, and you can appropriately draw on the two poets' views on nature. Creative Painting: Create a painting that embodies the theme of "Back to Nature", and briefly explain the idea of the painting in 3-5 English sentences. It should reflect the understanding of the content related to the two poets' return to nature in the text.		Deepen the cognition of nature through life practice, and cultivate English writing and viewpoint expression abilities. Understand the theme through diverse forms, take into account both artistic expression and English interpretation abilities, and stimulate learning interest.

4. Conclusion

The high school English reading teaching design based on artificial intelligence technology proposed in this thesis is a conception formed based on the current development level of educational technology and the needs of teaching practice. Among them, such links as structured sorting of texts and visualization of imagery comparison can be realized with the help of existing AI tools. However, their core still remains at the level of explicitly presenting words and thinking, failing to fully exert the potential of in-depth empowerment of artificial intelligence, and there are many aspects to be improved in practice.

From the perspective of technical application, the current design is difficult to meet the personalized learning needs of students. In the classroom, students naturally differ in cognitive level and learning rhythm. Although existing AI tools can provide basic information verification and prompts, they lack the ability to dynamically adjust individual learning paths. For example, they cannot automatically push adaptive hierarchical reading materials for students who have a slow understanding of texts; nor can they generate advanced inquiry tasks for students with active thinking. With the maturity of generative AI technology, a system with adaptive learning functions can be expected in the future. It can automatically generate personalized learning scaffolds by analyzing students' reading trajectories in real time (such as duration of stay, annotated content, error feedback). For instance, it can provide keyword annotations and sentence pattern analysis for students with weak foundations, and design cross-text association tasks for students with strong abilities, truly realizing "one thousand people, one thousand faces" of teaching support.

In terms of technology popularization, the limited application of immersive technologies such as VR is another shortcoming of the current design. Restricted by the cost of hardware equipment and the adaptability of teaching scenarios, it is difficult to allow students to intuitively feel the pastoral artistic conception described by Tao Yuanming and Thoreau's life by Walden Pond through the virtual environment, which to a certain extent affects the depth of cultural experience. In the future, with the popularization of lightweight VR devices and the maturity of educational scenario development, a "dual-scenario immersive comparison" module can be built. Students can "be in" the pastoral areas of the Wei and Jin Dynasties and the lakesides of 19th-century America respectively through VR devices. In virtual interaction, they can observe natural details (such as the shape of chrysanthemums, the texture of lake water), experience life scenes (such as farming, cabin building), and "talk" with poets through the AI voice interaction system to explore their state of mind when creating. This kind of immersive experience can break through the limitations of time and space, transform abstract views of nature into perceivable concrete experiences, and deepen cross-cultural understanding.

From the perspective of the expansion of teaching practice, although the evaluation system of the current design has introduced multi-dimensional feedback, it still focuses on quantitative data, and the evaluation of students' implicit thinking qualities (such as the depth of critical thinking, cultural empathy ability) is relatively weak. In the future, combined with emotion computing technology, a more three-dimensional literacy development report can be generated by analyzing the intonation of students in discussions and the emotional tendency of text expression. At the same time, with the construction of the educational data center, this design can be incorporated into a wider range of teaching collaboration networks. Teachers and students from different schools can share AI-generated teaching resources (such as personalized reading tasks, cross-school comparison and discussion results) to form a distributed learning community, so that the teaching theme of "Back to Nature" can be expanded from a broader perspective.

In addition, this study only focuses on the teaching design of a single text. In the future, this technology integration model can be promoted to reading teaching of more themes to form a systematic lesson case library. For example, in the reading of the theme of “cultural inheritance”, AI technology can be used to compare the practical paths of Chinese and foreign intangible cultural heritage protection; in the theme of “science and technology ethics”, the boundary of technological development can be discussed through situational simulation. Through continuous practice and iteration, a general framework of artificial intelligence empowering high school English reading teaching can be gradually built, providing a more operable paradigm for foreign language teaching reform oriented by core literacy.

In short, with the continuous evolution of artificial intelligence technology, the limitations in this design will be gradually broken through. However, technology is ultimately a means. The core in the future still lies in balancing the relationship between technological empowerment and the essence of teaching - letting AI tools always serve students’ in-depth learning and all-round development, and while improving the efficiency of reading teaching, safeguard the humanistic nature of language learning and the creativity of thinking.

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