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The Practice of 5E Reading Teaching in Senior High School English Focusing on the Cultivation of Thinking Quality

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Abstract

The *English Curriculum Standard for General High School (2017 Edition, revised in 2020)* explicitly emphasizes that the cultivation of thinking quality is an essential part of English classroom teaching in senior high school. The 5E teaching model can effectively cultivate students' diverse thinking qualities. However, at present, some senior high school English teachers fail to deeply excavate and widely expand the reading materials in reading teaching, which limits the development of students' reading ability and thinking diversity. Based on this, this paper first elaborates on the core concepts of the 5E teaching model and thinking quality in detail, and then deeply explores the construction of the 5E reading teaching model focusing on the cultivation of thinking quality. Finally, taking reading and thinking of Unit 4 in compulsory 1 published by PEP, The Night the Earth Didn't Sleep, as an example, this paper discusses the 5E reading teaching strategies focusing on the cultivation of students' thinking quality. The application of the 5E teaching model in senior high school English reading teaching can promote the enhancement of students' diverse thinking and achieve in-depth reading.

Keywords

5E Teaching Model; Thinking Quality; English Reading Teaching in Senior High School

1. Introduction

The *English Curriculum Standard for General Senior High School (2017 Edition, revised in 2020)* emphasizes the cultivation of students' core competencies in English, including language ability, cultural awareness, thinking quality, and learning ability. It also emphasizes progressively enhancing students' critical thinking, problem-solving, and innovation abilities [1]. Among them, thinking quality, as an integral part of the core competencies in English, has become an essential task in senior high school English classroom teaching. Reading is an active process of

information processing in which the brain utilizes verbal and nonverbal information to perform complex thinking activities such as judgment, reasoning, analysis, and synthesis [2]. English reading embodies the unity of the instrumental and humanistic natures of the English curriculum due to the rich cultural connotations of English education. English reading has unparalleled advantages in cultivating students' thinking quality in other subjects [3].

However, in the current practice of senior high school English reading teaching, the teaching focus of some teachers remains confined to the combing of surface-level textual information and the explanation of linguistic knowledge, while these teachers neglect the deeper analysis, interpretation and evaluation of thinking, culture, emotions and values embedded in the text. This superficial reading teaching not only fails to fully manifest the humanistic nature of the English subject but also hinders the cultivation of students' thinking quality and reading literacy. The philosophy upheld by the 5E teaching model aligns with the process of cultivating thinking quality and the educational requirements of the new curriculum standards. In this context, embedding the 5E teaching model into senior high school English reading teaching enables students to activate their thinking in the progressive phases of engagement, exploration, explanation, elaboration, and evaluation. This is of great significance for advancing the enhancement of students' thinking quality and facilitating the effectiveness of reading teaching.

2. The Core Concepts of the 5E Teaching Model and Thinking Quality

2.1. The Core Concept of the 5E Teaching Model

The 5E teaching model originated from the Atkin-Karplus Learning Cycle proposed by Robert Karplus and J. Myron Atkin during the American Science Curriculum Improvement Study (SCIS) in 1967, which consisted of preliminary exploration, concept introduction, and concept application [4]. In 1989, scientists like Bybee formally proposed the "5E Learning Cycle" based on constructivist theory, comprising engagement, exploration, explanation, elaboration, and evaluation, and named it the "5E Teaching Model" [5]. The internal logic of the 5E teaching model is to construct problematic situations, minimize explanations or provide guidance and explanations after students have thought and expressed their ideas, and guide students to think independently and learn cooperatively, which is an effective way to develop students' multiple thinking qualities.

First, engagement is the starting point of the 5E teaching model, in which teachers need to create a relaxed and active classroom atmosphere, stimulate students' interest in participating in the classroom, activate and understand students' existing schemas, and make students curious about new concepts, to help students prepare for participating in the classroom at both the intellectual and emotional levels. Second, exploration is the center of the 5E teaching model, and this stage

emphasizes learner-centeredness, with the teacher playing the role of facilitator. Teachers can organize students to carry out exploration activities to identify previous misconceptions and acquire new knowledge through various forms such as group work, paired activities, and independent student inquiry. Teachers should give appropriate guidance to help students deepen their understanding of the text. Third, in the explanation stage, teachers need to guide students to focus on the key content of the engagement and exploration stage. Meanwhile, teachers should provide opportunities for students to be able to present the results of their discussions. For instance, students can elaborate their knowledge of new concepts based on their understanding. Fourth, in the elaboration phase, teachers need to further test the knowledge acquired by students in previous activities, guide students to apply the acquired information to relevant real-life situations and promote the internalization and transfer of knowledge. Fifth, in the evaluation stage, teachers encourage students to assess their classroom performance through self-assessment, peer assessment and other diversified evaluation methods.

2.2. The Core Concept of Thinking Quality

Thinking quality refers to the manifestation of intelligence and ability in an individual's intellectual activities, especially in thinking activities, and its essence reflects the individual characteristics of human thinking [6]. Thinking quality is regarded as a significant indicator to measure the level and quality of an individual's thinking and intelligence, mainly including profound thinking, flexible thinking, creative thinking, critical thinking and agile thinking [7]. Specifically, profound thinking is reflected in the extensiveness, depth and difficulty of thinking activities. People with this trait in intellectual activities will conduct an in-depth analysis of problems, excel in generalization and categorization, possess strong logical abstraction abilities, and grasp the essence of things and underlying laws through phenomena. Flexible thinking reflects the degree of flexibility in thinking activities. Individuals who excel in this area can break out of fixed patterns of thinking, recognize problems from multiple perspectives, and quickly reorganize information to adapt to changes. Creative thinking refers to an individual's innovative spirit in thinking activities. Individuals who excel in this area do not conform to rules and regulations, but are able to seek out differences and new ideas, dare to imagine, be adaptive to change, get rid of the stale and bring forth the fresh. Creative thinking is the most central ability of thinking [8]. Critical thinking reflects the degree of independent analysis and criticism in thinking activities. Its essence is the result of self-consciousness at work in the thinking process, involving reflection, self-monitoring, metacognition, etc., which enables individuals to continuously strengthen their understanding of the objective world and themselves [9]. Agile thinking refers to the rapidity of the thinking process, namely the speed of reaction. Those who excel in this area have a keen sense of perception, can quickly recognize

the nature of a problem, and are able to use existing knowledge and experience flexibly and sensitively to solve problems.

The *English Curriculum Standard for General Senior High School (2017 Edition, revised in 2020)* elaborates on the thinking quality from the two levels of the essential characteristics of thinking and the level of performance. Thinking quality reflects the mental characteristics of the core competencies in the English subject, which refers to the ability and level of thinking expressed in terms of logic, criticality and creativity [10]. Meanwhile, the objectives of thinking quality in the curriculum mainly cover the ability to analyze specific phenomena in language and culture, sort out and summarize information, construct new concepts, analyze and infer logical connections between information, make correct judgments on various ideas and opinions, express one's own opinions creatively, and form the awareness of diversified thinking and the ability of innovative thinking.

Therefore, this paper will explore the application of the 5E teaching model in senior high school English reading teaching based on the five aspects of thinking quality and the definition of thinking quality in the *English Curriculum Standard for General Senior High School (2017 Edition, revised in 2020)*.

3. The Construction of 5E Reading Teaching Model Focusing on the Cultivation of Thinking Quality

The 5E reading teaching model, which centers on the cultivation of thinking quality, incorporates specific goals and approaches for developing thinking quality in each of the five stages: engagement, exploration, explanation, elaboration, and evaluation (as shown in Figure 1).

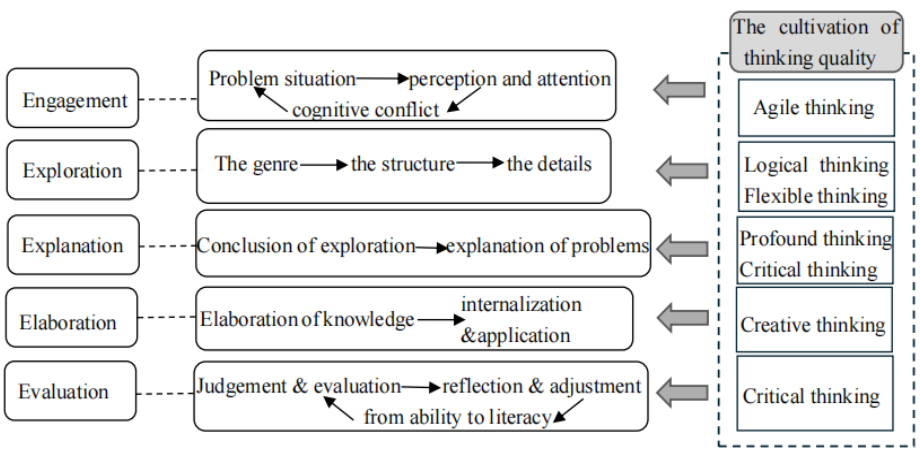


Figure 1. 5E Reading Teaching Model Focusing on the Cultivation of Thinking Quality

In engagement, the teacher creates real-life situations related to students' actual lives or design inspiring questions to understand and activate students' pre-existing schemas, triggering cognitive conflicts and prompting students to quickly deploy their existing knowledge to respond. This process contributes to the development of

students' agile thinking.

In exploration, the teacher guides students to sort out the logical relationship between reading passages through genre exploration and structure exploration, which strengthens the development of students' logical thinking. Meanwhile, when exploring the details, students need to integrate the information in the reading text to answer the closed questions, and break the inherent pattern of thinking, analyze the open questions from multiple perspectives, so as to cultivate students' flexible thinking.

In the explanation section, the teacher should provide students with opportunities for classroom presentations, and students need to utilize their language to explain their findings and ideas. For instance, students display mind maps in groups and explain the basis for construction, which needs to deeply process and summarize the information, which helps students to develop profound thinking. Meanwhile, other groups can question and analyze the group's ideas, thus developing students' critical thinking.

In the elaboration section, the teacher creates a relevant new situation and asks students to synthesize the knowledge and methods acquired in the above sections, break through the limitations of the reading text, and put forward innovative solutions. This process can not only realize the internalization and application of knowledge, but also contribute to the development of students' creative thinking.

In the evaluation section, multiple assessment methods are adopted, and students reflect on and monitor their metacognition in multiple dimensions through self-assessment, mutual assessment and teacher's comments. Meanwhile, students adjust their learning methods based on the evaluations and feedback they receive, gradually achieving an improvement from ability to literacy. This kind of reflective thinking activity can deepen the enhancement of students' critical thinking.

4. The 5E Reading Teaching Strategies Focusing on the Cultivation of Thinking Quality

This chapter takes the reading text *The Night the Earth Didn't Sleep* (from Unit 4 Natural Disasters in the 2019 PEP edition of the new Senior High School English textbook) as an example to explore how to cultivate students' thinking quality in senior high school English reading teaching via the 5E model, so as to foster their awareness of divergent thinking and innovative thinking skills.

The theme of this unit is "Natural Disasters", with the thematic context of "human and nature". The reading text, *The Night the Earth Didn't Sleep*, belongs to the genre of literary journalism, which is characterized by both authenticity and literariness. In terms of discourse structure, the overt thread unfolds chronologically, describing the Tangshan earthquake to readers in the order of its pre-earthquake signs, during-earthquake scenes, destruction degree, rescue efforts, and post-disaster reconstruction. The covert thread, meanwhile, focuses on people's emotions,

attitudes, and behaviors before, during, and after the natural disaster. In terms of rhetorical techniques, the discourse utilizes rhetorical methods such as prose, anthropomorphism, hyperbole, and simile, which imparts a more graphic sense to the text and gives readers room for imagination. On the whole, the text is full of vivid descriptions and emotions, reflecting the author's central idea that disasters are merciless, but people are kind-hearted. In this lesson, students are asked to read the text to understand the earthquake that happened in Tangshan in the 1970s, to learn the language characteristics of literary journalism, and finally to describe natural disasters in their own words to build up awareness of disaster prevention and self-protection.

4.1. Creating Authentic Problematic Situations

The engagement stage is designed to fulfill the classroom guidance task. The teacher should closely follow the thematic context of the article, select the problematic situation related to the students' real-life experience and the theme of the discourse to lead into the classroom, which can naturally expose the preconception, identify cognitive bias, and then trigger the cognitive conflict of the students to stimulate the students' enthusiasms for inquiry, so that the students can quickly enter the thematic context of the unit. This process not only facilitates students to actively become the main subject of classroom learning, but also prompts students to quickly activate their existing prior knowledge, which fully embodies the training of students' agile thinking.

In the engagement stage, the topic of "teachers' insomnia" is introduced. The discussion of "causes of insomnia in human beings" activates students' daily cognition. Afterward, the dynamic picture of "earth's insomnia" is presented to guide students to think about the possible causes of "earth's insomnia" through analogy and association, which naturally led to the topic of "earthquake". Then, the teacher leads students to watch a clip from the movie Tangshan Earthquake, which is accompanied by the key vocabulary of the lesson. It encourages students to efficiently capture the details of the scene, such as the collapse of houses and the panic of the crowd in a limited period, acquiring the meaning of the vocabulary instantly. After watching the video, the teacher guides students to think about the question "What happened during the earthquake?" and asks them to combine their observations with their prior knowledge to describe the images in the video and express their feelings.

This process exercises students' ability to integrate information quickly, as well as the ability to respond instantly to verbal expressions, reflecting the goal of developing agile thinking. Meanwhile, this activity effectively reduces the cognitive load of subsequent reading by activating the background knowledge related to earthquakes and providing contextualized usage of key and difficult vocabulary, so that students can focus more on deeper comprehension of the text and lay the

foundation for subsequent reading activities.

4.2. Exploring Textual Information

The exploration stage is designed to fulfill the tasks of the classroom seminar. In order to solve the cognitive conflicts generated by students in the engagement phase of the classroom, the teacher provides students with the conditions and opportunities for exploration and guides them to acquire and sort out the content of the discourse. Through generalization and integration activities, students can summarize the linguistic features and discourse structure of the reading text, and then construct new knowledge structures [11]. This process focuses on training students' ability to generalize and construct, which positively contributes to the enhancement of logical and flexible thinking.

The exploration stage includes various levels of activities such as reading for prediction, reading for the text type and structure, and reading for details. In reading for prediction, the teacher guides students to predict the content of the text based on the pictures and the title and to think about the implication of this title. In reading for the text type and structure, the teacher first asks students to recognize the text type of the article based on the title and its rhetorical devices. Secondly, students are asked to skim the whole text, summarize the main idea of each paragraph, clarify the structure of the text, and use a fishbone diagram to sort out the chronological order of the text. In reading for details, the teacher asks students to work in groups to refine the fishbone diagram of the previous activity or make their own mind maps based on the pre-earthquake signs, the scene and damage situation when the earthquake happened, and the rescue and post-disaster reconstruction after the earthquake. Meanwhile, discuss the following questions. Q1: Can you draw and describe the change of people's feelings according to the passage? Q2: Find out the sentences where figures of speech are used and their function. Q3: What kind of help do you think people who have suffered an earthquake need? Q4: What other cities or towns have gone through similar changes? What lessons can we learn from these events?

These reading activities enable students to understand the pre-earthquake signs, the scene and damage during the earthquake, the post-earthquake rescue and post-disaster reconstruction, and so on, so as to sort out the lines of the article, construct the discourse structure of literary journalism, and cultivate logical thinking. In addition, students need to think about the deeper meaning of the title of the article, the methods of assistance for the victims of the disaster, and their personal reflections and feelings about the earthquake from multiple perspectives, which prompts students to break out of their fixed thinking patterns and contributes to the training of students' flexible thinking.

4.3. Explaining the Conclusion of the Exploration

Explanation is designed to conduct a classroom demonstration task. Under the guidance of the teacher, students elaborate on the information they have acquired in the exploration session, share their interpretations of the questions, explain their reasons, and develop their critical thinking. The exploration session is the students' basic understanding of the text in reading teaching, then the explanation session focuses on the students' deeper thinking of the text, emphasizing the cultivation of students' profound thinking [12]. In addition, explanations and resources provided by the teacher can be supportive of students' deeper understanding [13]. Teachers can assist students to further clarify the textual information by asking follow-up questions, so as to realize a comprehensive and profound understanding of the text.

In the explanation stage, the teacher invites three groups of students to talk about and show their fishbone diagrams (as shown in Figure 2) or mind maps, and each group retells a passage of the text according to their mind maps. After the three groups have finished presenting, the teacher invites the group representatives to present the emotion change diagrams drawn by their own groups (as shown in Figure 3) and orally present the results of the discussion of the previous question, and the rest of the students can make corrections or additions to the results.

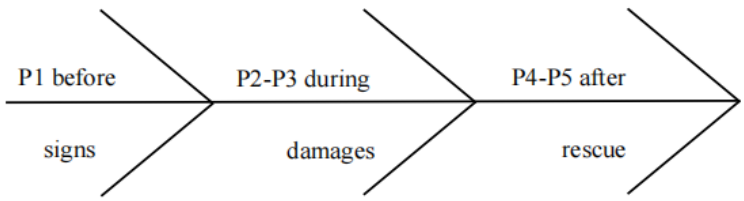


Figure 2. Fishbone Diagram of the Plot Development of the Article

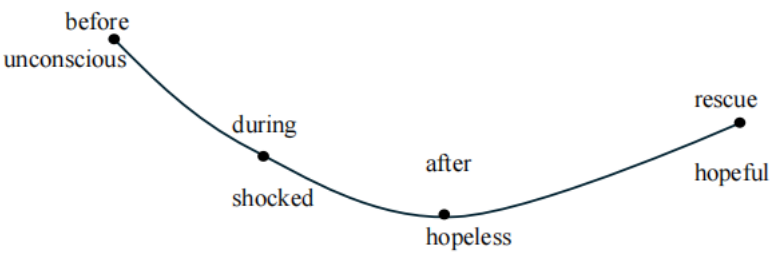


Figure 3. The Process of Emotional Change

In this process, by presenting the mind maps completed collaboratively and retelling the key information of the article, students are conducive to deepening their understanding of the content of the article, internalizing the knowledge of the book and promoting the development of profound thinking. Meanwhile, the representatives of the group questioned, corrected and supplemented each other in the exchange and collision of views by reporting the results of the discussion, which aids students in optimizing their understanding of the content and developing critical thinking.

4.4. Elaborating into New Problematic Situations

Elaboration aims to guide students in applying their learned knowledge to a new context, so as to facilitate the transfer of learning. Specifically, students identify the linguistic form and structure of the discourse, reason about the values embedded in the discourse, analyze the author's emotional attitude, grasp the significance of the theme, solve the problems and express their views in the new context through imagination and creativity, realize transfer and innovation, train their identification and innovation skills and cultivate creative thinking.

The teacher creates an earthquake-themed interview activity situation, organizing students in pairs to carry out role play, one student plays the role of a journalist, and the other plays the role of survivors of the earthquake. The interview content can include what was seen, heard, experienced, and felt before, during, and after the earthquake. Meanwhile, in order to fully stimulate students' creativity and initiative, the content of the interviews closely follows the core theme on the basis of allowing students to incorporate their own knowledge and thinking based on the expansion of the topic, do not have to be completely confined to reading the text of the established content. In the interviews, students use the vocabulary and expressions they have learned in the lesson and combine them with their own accumulation outside the classroom to communicate, which is helpful for students to consolidate the content of the text and develop their listening and speaking skills and language ability. In addition, students can express their intentions, opinions and attitudes creatively in the interview activity, which contributes to the realization of the improvement of students' knowledge transfer ability and the cultivation of creative thinking.

4.5. Evaluating Learning Effectiveness

The evaluation stage encourages students to assess their mastery of knowledge and skills while allowing teachers to evaluate students' learning performances. Assessment helps develop students' dialectical thinking and enhance the criticality of their thinking. In the evaluation phase of the 5E reading teaching model, students conduct peer assessment using evaluation form generated from each classroom step, to examine the learning effectiveness of this reading class and target personal shortcomings based on peer feedback. The teacher should make full use of the evaluation form to guide students in critical thinking, addressing the issue of absent critical reflection in reading instruction.

In the evaluation stage, the teacher introduces the classroom reading evaluation criteria to students (as shown in Table 1), clarifies the evaluation tasks, and guides students to conduct self-assessment first and then peer assessment. After the evaluation, the teacher selects several students with typical performance for oral feedback. Through self-assessment and peer assessment, students can promptly identify their strengths and weaknesses in the reading process, thereby facilitating

experience summarization and improvement. Meanwhile, by reflecting on problems and exploring solutions, students can enhance their problem awareness and develop critical thinking.

Table 1. Classroom Reading Effectiveness Evaluation Form

Criteria	Self-evaluation			Peer evaluation		
	A	B	C	A	B	C
I can grasp the basic information of "Tangshan Earthquake".						
I can appreciate the structure and language features of the literary journalism.						
I can perceive the author's intention conveyed in this article.						
I can take an active part in the group discussion and put forward my opinions.						
I can actively converse with peers and add my ideas during interviews.						
Problem						
Solution						

5. Conclusion

To sum up, this paper elaborates on the core concepts of the 5E teaching model and thinking quality, discusses the influence of various aspects of the 5E teaching model on the enhancement of students' thinking quality, and makes us more deeply realize that teachers should give full weight to the advantages of the 5E teaching model in English teaching, and combine language learning with the cultivation of thinking quality organically. Specifically, teachers should improve their own professionalism, fully recognize the necessity of the enhancement of thinking quality and the feasibility of the 5E teaching model, and create contexts that are close to students' real-life discourse environments in order to promote the internalization of students' knowledge. Meanwhile, teachers should be learner-centered, change from knowledge transmitters to facilitators of students' learning, pay close attention to the individual differences and different needs of students in the learning process, and teach students according to their abilities. For example, pay as much attention as possible to students' performance when they are exploring and explaining. When students encounter difficulties, teachers should give timely and targeted guidance and help to build bridges for the students' thinking process. In addition, teachers should utilize the evaluation section to provide timely feedback on the teaching effect and dynamically adjust the teaching strategy. Therefore, applying the 5E teaching model to senior high school English reading teaching not only contributes to solving the problems of fragmentation of teaching content, the superficiality of comprehension level and fragmentation of knowledge structure that exist in some

reading classrooms at the present stage, but also is effective for the enhancement of students' thinking quality in terms of agility, profundity, flexibility, logic, criticality and creativity.

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