Education and Social Work
ISSN Print: 3079-515X
ISSN Online: 3079-5168
https://doi.org/10.63313/ESW.9021

How to Use Question Chains to Develop Students' Critical Thinking in Senior High School English Reading Teaching

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How to cite this paper: Zhao, X. R. (2025). How to Use Question Chains to Develop Students' Critical Thinking in Senior High School English Reading Teaching. Education and Social Work, 1(2), 177–184. ISSN Print: 3079-515X; ISSN Online: 3079-5168. https://doi.org/10.63313/ESW.9021
Published:2025-04-22

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Abstract

This paper elaborates the use of question chains to enhance critical thinking in senior high school English reading teaching, aligning with The English Curricu-lum Standards for Senior High Schools (2017) Edition Revised in 2020). It pre-sents a theoretical framework based on Vygotsky's ZPD and Bloom's Taxonomy, suggesting that question chains can stimulate students' analytical and evaluative thinking within their ZPD. The study offers pedagogical strategies for designing question chains and illustrates their application with a case study. It concludes that question chains are a promising approach to develop students' core compe-tencies, especially the critical thinking.

Keywords

Question chain; critical thinking; senior high school students; English reading teaching

1. Introduction

1.1 Background of the Study

The English Curriculum Standards for Senior High Schools (2017) Edition Revised in 2020) proposed that English teaching in senior high schools should focus on cultivating students' core competence in the English discipline. The core competence consists of language ability, cultural awareness, thinking quality and learning ability. And critical thinking is a crucial part of thinking quality. The integration of critical thinking skills into the English reading curriculum is essential for preparing students for the demands of higher education and the workforce. However, many English teachers often focus on superficial understanding in reading teaching, neglecting the development of higher-order thinking skills. Question chains, a series of logically connected questions, have been identified as an effective method to stimulate student thinking and discourse (Wang et.al, 2023). Therefore, it's necessary to ex-

plore how to use question chains to develop students' critical thinking in reading teaching.

1.2 Purpose and Significance of the Study

This paper aims to investigate how question chains can be effectively utilized in senior high school reading teaching to foster critical thinking. Meanwhile, it will offer some pedagogical implications concerning this topic.

As for the theoretical significance, this study contributes to the field of educational pedagogy by exploring the application of question chains within the context of English reading comprehension. It provides a deeper understanding of how questioning strategies can be systematically designed to foster critical thinking skills, enriching the current studies of question chains.

As for the practical significance, the study offers actionable insights for English teachers in senior high. The study also provides a framework for designing and implementing question chain activities, which can be easily integrated into existing curricula, making it a valuable resource for both new and experienced English teachers.

2. Literature Review

2.1. Question Chains

Huang Guangrong (2003) viewed question chain as a mathematical thinking mode. Later, Wang Houxiong (2010) proposed that a question chain refers to a series of centralized, sequential, and interrelated teaching questions used to accomplish specific instructing objectives. The question chain is one question after another in form and one link after another in content. In terms of the classifications.

Wang (2010) divided the question chains into the following types:

(1) Introducing question chains: These are designed to initiate discussion or thought on a topic. This type of question chain is often used to engage students at the beginning of a lesson or activity.

(2) Differential question chains: Aimed at distinguishing between different concepts or ideas. This classification helps students to differentiate between similar but distinct ideas or concepts.

(3) Diagnostic question chains: Used to assess students' understanding or misconceptions. These chains are often used formatively to check students' comprehension and address any misunderstandings.

(4) Exploratory question chains: Encourage students to explore a topic in depth. These chains are designed to guide students through a deeper analysis of the material

(5) Transferring question chains: Help students apply knowledge to new contexts. This type of chain is used to consolidate learning and encourage students to transfer their understanding to different situations.

(6) Flexible question chains: Adapt to the responses and thinking of students. These chains are designed to be responsive to the students' answers and can be adjusted on the fly by the teacher.
(7) Summary question chains: Used to summarize or review key points. These chains are typically used at the end of a lesson to reinforce the main ideas.
(8) Progressive question chains: Build on previous questions to lead to a deeper understanding. These chains are structured to progressively lead students to higher levels of understanding.

2.2. Critical Thinking

This term, was coined by John Dewey in the book How We Think (1910) and was adopted by the progressive education movement as a core instructional goal that offered adynamic modern alternative to traditional educational methods such as rote memorization. Focione (1990) pointed out that critical thinking is a multifaceted cognitive process that involves the ability to analyze, evaluate, and synthesize information objectively. It is a higher-order thinking skill that goes beyond merely recalling facts or procedures. What's more, critical thinking is characterized by a broad set of related skills, including the abilities to break down a problem into its constituent parts, recognize and account for one's own biases, collect and assess relevant evidence, adjust and reevaluate one's own thinking in response to new information, and form a reasoned assessment to propose a solution or a more accurate understanding of the topic at hand (Elder& Paul, 2013).
Critical think also consists of analytical thinking, creative thinking and idea generation, decision-making, problem-solving, reflection and assessing evidence, open-mindedness, good communication, evaluation and reasoning, logicality. (Heard et.al, 2020)

2.3 Theoretical basis

(1) Vygotsky's Zone of Proximal Development: Lev Vygotsky's theory of the zone of proximal development (ZPD) states that learners develop new skills most effectively when they are operating within their ZPD—just beyond their current level of understanding (Vygotsky, 1978). Question chains are designed to push students slightly beyond their current comprehension level, providing just enough challenge to stimulate critical thinking and learning without causing frustration.
(2) Bloom's Taxonomy: Benjamin Bloom's taxonomy(1956) of educational objectives provides a framework for categorizing educational goals into a hierarchy of complexity and specificity. Question chains can be designed to align with Bloom's taxonomy, starting with lower-order thinking skills (knowledge, comprehension, application) and progressing to higher-order thinking skills (analysis, synthesis, evaluation).

2.4 A Review of Studies on Critical Thinking and Question Chain

Liang, Khatib, and Ebadi (2010) explored the instructional implications of Vygotsky's Zone of Proximal Development (ZPD) and how question chains can serve as scaffolders to facilitate language development. They concluded that question chains, as a form of scaffolding, can effectively support students in achieving mastery in a knowledge domain, which is inherently motivating and engaging for learners; A study by Kawalkar and Vijapurkar (2013) investigated the role of teachers' questions in the inquiry classroom, highlighting how scaffolding science talk with question chains can enhance students' critical thinking. Echeverri and Sancho (2016) proposed a taxonomy of questions to develop thinking skills, emphasizing the role of different types of questions in fostering critical thinking; Li (2023) explored the use of question chains in college English teaching, finding that this approach stimulates students' thinking skills, creativity, and critical thinking, helping them develop problem-solving abilities.

To summarize, these studies collectively indicate that question chains, when strategically designed and implemented, can have a significant impact on the development of students' critical thinking skills. However, little study focuses on the specific type of English class and concrete context in senior high, so there is still a need to investigate the implement of question chains in reading teaching to foster senior high school students' critical thinking.

3. How to design question chains to foster critical thinking in reading

In this part, the author will offer some pedagogical suggestions on how to design question chains to enhance students' critical thinking based on the activity-based approach to English learning. Shao and Jiang (2024) emphasized the importance of creating question chains that are relevant, challenging, and logically connected. Each question should build upon the previous one, leading students to deeper levels of understanding. This structured approach helps students to engage with the text more deeply and to develop higher-order thinking skills. Based on the English curriculum standards (2020), question chains should align with the activity-based approach to English learning. This approach involves three-level activities: Learning and understanding, applying and practicing, transferring and creating. Accordingly, different questions chains are expected to be utilized effectively at different level activities, making it possible for English teachers to develop students' critical thinking. The author will take the text The Underdog from B1U2 (BNU press) as an example to elaborate the designing of question chains in reading teaching. The relevant analysis is as follows:

- **Analysis of the material:**

What: The text is a narrative that revolves around the theme of "sports spirit". It tells the story of Paul, a member of the school basketball team, who is initially an underdog due to his short stature. Despite being a replacement player and not being taken

seriously by the coach, Paul's love for basketball and his determination to improve lead him to practice harder than anyone else. The story reaches its climax when Paul gets a chance to play in an important game and, against all odds, helps his team win.

Why: The author's purpose in writing this narrative is to convey the message that inherent disadvantages do not equate to inevitable failure. Hard work and perseverance can overcome inborn shortcomings. The story is meant to inspire students to maintain a positive attitude, to be optimistic and persistent in the face of challenges, and to seize opportunities when they arise. It also aims to foster an understanding that success is not solely determined by physical attributes but by one's character and effort.

How: The narrative is structured in a way that highlights Paul's journey from being an underdog to earning his place on the team through his dedication and skill. The story is divided into two parts: the first part establishes Paul's background, his love for basketball, and his challenges. The second part follows the actual game where Paul gets his chance to shine. The language used is straightforward and factual, with a strong emphasis on dialogue that captures the tension and excitement of the game. The use of past tense throughout the narrative helps to convey the sequence of events and the development of the characters. The story is engaging and relatable, using basketball terminology and scenarios that are familiar to students, which helps to maintain their interest and engagement. The author effectively uses Paul's transformation to illustrate the broader themes of personal growth and the triumph of spirit over adversity.

- **Analysis of students:**

Basketball is a form of physical exercise that students often engage in, so they are more familiar with the topic of the lesson and have some basic vocabulary about sports and basketball, so it's easier for them to access the factual information in the article. However, it is not easy for students to integrate fragmented information and construct structured knowledge, which requires the teacher to design interrelated and progressive chains of questions to interpret the story and characters from multiple perspectives and develop students' thinking skills.

- **Teaching objectives:**

(1) Access and sort out detailed information about Paul himself and the basketball game. (Learning & Understanding)

(2) Integrate the main content of the text with a mind map. (Applying & Practicing)

(3) Analyze the motives behind the coach's behavior and evaluate the character comprehensively. (Applying & Practicing)

(4) Transfer the values they learned from this text to self-reflection. (Transferring & Creating)

3.1. Learning & Understanding

There are two parts at this level.

In the first part at this level, the teacher introduces the topic and activates students'

known knowledge in order to create a situation, make them familiarize with the topic, and pave the way for the language learning.

Question chain:

Q1. What do you think an underdog is?

Q2. Do you know any basketball players?

Q3. What makes a great basketball player?

In the second part, students are guided by the teacher to do a preliminary reading of the first and second parts of the article to understand the synopsis of the story.

Question chain：

Q1. What is Underdog?

Q2. prediction: What do you think will happen in Part 2 according to "…Paul didn't know he'd soon get the chance that he'd been waiting for"?

3.2. Applying & Practicing

Also, this level includes two parts.

The first part aims at sorting out details and constructing schemas by accessing and sorting out factual information in the text as well as internalizing language.

Question chains:

Read Part 1 again and answer the questions.

(1)Why is Paul an underdog?

(2)How was he treated by the coach?

(3)Why does he still play basketball?

(4)Why is Bogues his favorite player?

(5)What advantages does Paul have?

Read Part 2 and answer the questions.

(1)What is the correct order of the events?

(2)How did the coach's feelings change? (Support you answer with evidence.)

(3)Can you draw a mind-map about the advantages and disadvantages of Paul and how the coach's attitude changed?

The second part involves open-ended questions for students to internalize and apply the content of the discourse, to analyze and make judgments, and to develop students' logical and critical thinking skills.

Q1. Why did the coach call Paul "big guy"?

Q2. Why could Paul make it? What kind of player was Paul? (Support your answers with evidence.)

Q3. What have you learned from Paul's story?

3.3 Transferring & Creating

Two parts are involved at this level.

The first part is to reorganize the fixed collocations or language expressions in the text for oral output.

Role Play: Work in groups of 4, and interview Paul and his coach. Two students play

the roles of journalists, one as Paul and another as the coach.

(1)What questions will you prepare?

(2)How to respond to the questions?

The last part is homework. The teacher creates new situations to help students internalize and apply what they have learned while examining their own attitude towards Paul from the coach's perspective.

Homework: Suppose you were the coach and you are going to write a monologue to show how your attitudes to Paul changed, how to make your writing vivid and interesting?

4. Conclusion

In the above teaching design, the teacher designs the question chains which are interlocking and progressive, driving students to explore from discourse to in-depth discourse and then to beyond discourse at three stages, realizing low-order thinking to middle-order thinking and then to high-order thinking. The integration of question chains in senior high school English reading is a promising approach to foster critical thinking, contributing to the development of students' core competency.

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