The Cultivation of Innovative Thinking and Its Pathways in College English Education

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Abstract: *Against the backdrop of the continuous evolution of cognitive education concepts and the deepening objectives of higher foreign language teaching, the cultivation of innovative thinking has become a key developmental direction in college English education. Focusing on the embedding mechanism of innovative thinking in college English instruction, this study conducts a systematic investigation into its cognitive characteristics, mechanisms of linguistic expression, and the structural reconstruction of the teaching system. The article first explores the compositional model of innovative thinking and its intrinsic coupling with knowledge schemata and linguistic carriers, and subsequently constructs a teaching pathway system centered on "task-driven—content expansion—interactive generation." Furthermore, optimization strategies are proposed across three dimensions: teaching assessment, teacher guidance, and environmental construction. The findings indicate that innovative thinking not only relies on the complexity of linguistic expression but also heavily depends on the organization and activation of cognitive resources within the teaching system. By building diversified structures and dynamic support systems, college English education can effectively achieve a shift from language input to the generation of thinking, thereby providing cognitive support for the cultivation of interdisciplinary talents.*

Keywords: *college English teaching; innovative thinking; cognitive pathways; task-driven; language generation; teaching mechanism*

Introduction

As one of the core competencies for talents in the context of the information society and the era of intelligence, innovative thinking is becoming a crucial breakthrough in the reform of college foreign language education. Traditional English teaching models often focus on the standardized input of linguistic knowledge and the training of language skills, while neglecting the systematic development of thinking construction and cognitive transfer during the language learning process, thereby limiting both the depth and breadth of students' language application. Based on the ongoing integration of language cognition research and teaching theory, introducing innovative thinking into college English classrooms not only helps enhance students' abilities to identify and solve problems but also facilitates the construction of a new teaching ecosystem characterized by the co-evolution of language and thinking. In light of this, this paper systematically explores how to effectively embed the cultivation mechanism of innovative thinking into college English education from three dimensions: theoretical foundation, instructional pathways, and mechanism optimization. The aim is to provide theoretical support and methodological references for reconstructing teaching content and structure, thereby promoting a paradigm shift in English education from a "language competence-oriented" to a "thinking generation-oriented" model.

1. Theoretical Foundations of Innovative Thinking in College English Education

1.1 Cognitive Characteristics and Structural Composition of Innovative Thinking

As a core form of higher-order cognitive ability, innovative thinking differs from traditional linear logical reasoning by exhibiting features of openness, complexity, and structural evolution. In the process of language cognition, innovative thinking not only relies on the understanding and mobilization of existing knowledge structures but also emphasizes breaking through conceptual boundaries and reorganizing semantic configurations. Its cognitive structure is characterized by high

decentralization and multi-pathway construction, as manifested in the flexibility of lexical activation, the generativity of syntactic processing, and the dynamic reorganization of discourse. From the perspective of connectionism, innovative thinking can be regarded as a cyclical mechanism of activation–transfer–reconstruction within the language representation system, which continuously generates new semantic structures and expressive intentions driven by language input [1].

In terms of structural composition, innovative thinking involves the coordinated operation of multiple cognitive submodules, including semantic association, analogical reasoning, counterfactual thinking, and situational transfer. These abilities do not function through linear accumulation but are expressed as dynamic interactions and pathway reconstructions within complex contexts. For instance, in academic English writing or oral expression tasks, students are often required to extract information from multiple language input sources, integrate it using multidimensional encoding strategies, and produce language output with a high degree of originality and logical tension. The cognitive efficacy of innovative thinking lies in its capacity to simultaneously draw on multi-channel linguistic resources and to reconstruct and transform existing expressive patterns, thereby achieving the expansion of meaning and diversification of expressive forms.

1.2 The Relationship Between Knowledge Schemata and Thinking Activation in College English Education

Knowledge schemata are core cognitive structures in language comprehension and thought processing, forming semantic network systems developed through learners' long-term experiential accumulation. In college English teaching, knowledge schemata are reflected not only in the activation of grammatical rules and lexical semantics but also in the coordinated activation of pragmatic logic, discourse structures, and cross-cultural contexts. Effective English instruction requires not only the construction of a systematic knowledge schema framework but also the use of language tasks to drive schema activation and reorganization, enabling learners to develop dynamic and transferable cognitive pathways during language processing. The activation of these cognitive pathways not only enhances the automatization of language comprehension but also provides foundational support for cognitive transformation and creative expression.

The activation of knowledge schemata is highly correlated with the generation of innovative thinking, particularly in complex language tasks, where schema transfer ability becomes a key factor in driving cognitive innovation. When students encounter unfamiliar contexts or semantic conflicts, existing schema systems often fail to directly process new input, necessitating cognitive adjustment through schema reconstruction and the expansion of semantic boundaries. Instruction can incorporate language tasks such as context switching, perspective shifting, and cultural comparison to guide students in modifying or integrating existing cognitive structures, thereby enhancing their cross-context transferability and semantic creativity. On this basis, a dynamic linkage between language input and schema structures can be established, activating students' cognitive tension and laying the foundation for innovative expression.

1.3 Linguistic Carriers and Expressive Mechanisms of Innovative Thinking Generation

Language is not only a tool for the externalization of thought but also a mediating mechanism through which cognitive structures are represented and transformed. In the process of generating innovative thinking, the representational capacity of language directly determines the level of thought visualization and the precision of logical expression. To achieve deep cultivation of thinking abilities, college English instruction must emphasize the reconstruction and enhancement of linguistic expressive mechanisms. Specifically, innovative thinking relies on the multiple functions of language in semantic generation, pragmatic regulation, and discourse construction, which are reflected in various linguistic operations such as syntactic deconstruction, metaphor generation mechanisms, and rhetorical deployment strategies. Language is not a passive vessel that carries thought; rather, it actively imposes formal constraints and logical direction on thought expression through its structural framework [2].

At the level of expressive mechanisms, innovative language expression often achieves cognitive breakthroughs by disrupting conventional semantic chains and logical sequences. For instance, by manipulating syntactic variations, shifting information focus, and flexibly employing discourse strategies, learners can produce integrative outputs that convey multiple semantic intentions. If instructional design incorporates language practice tasks such as multimodal expression, situational reconstruction, and contextual simulation, students can be effectively encouraged to explore diverse

expressive forms during language production, thereby constructing pathways for the co-development of language and thinking. As a cognitive mapping system, the linguistic carrier—through its formal selection, structural configuration, and pragmatic strategy—directly determines the quality and efficiency of innovative thinking presentation and expression.

2. Pathways for Embedding Innovative Thinking in College English Teaching

2.1 Task-Driven Mechanism for Innovation in Instructional Design

The task-driven mechanism serves as the fundamental interface for embedding innovative thinking into the teaching system. By designing instructional tasks that possess cognitive challenge and open-ended exploratory potential, it is possible to effectively guide students to engage in creative language use within authentic or simulated contexts. Teaching tasks should not be limited to the reproduction of linguistic knowledge or mechanical drills; instead, they should incorporate multiple cognitive variables across pragmatic goals, contextual constraints, and strategic pathways, prompting learners to activate diverse thinking strategies when confronted with semantic uncertainty, thereby constructing problems and reorganizing expressions. Tasks characterized by inquiry, construction, and collaboration can stimulate the interactive generation of both linguistic and cognitive systems, thus expanding the structural depth and expressive breadth of language learning.

The design of higher-order tasks can be structured around a three-tier "context–problem–expression" framework: by introducing multimodal input (such as images, audio, and charts), a channel is created for the integration of linguistic and non-linguistic resources; by setting communicative scenarios with multiple possible solutions, students are encouraged to make semantic judgments and strategic choices during the process of meaning construction; by constructing output-oriented tasks, students are required to generate language products featuring structural innovation and expressive variation. This instructional mechanism not only reconstructs the linear input–output path of traditional teaching but also establishes a closed-loop system of language, thinking, and expression, thereby effectively facilitating the activation and articulation of innovative thinking.

2.2 Construction of Thinking-Expansion Structures in Instructional Content

The organization of English instructional content directly determines the depth and structural space of cognitive engagement. Teaching content should move beyond the closed system centered on grammatical rules and vocabulary accumulation and shift toward a structured content design that emphasizes cognitive challenge and cross-contextual reconstruction. Content design should reflect thematic openness, knowledge connectivity, and cultural diversity, enabling students to construct linguistic meaning and cognitive pathways within a multidimensional cognitive framework. By introducing the conceptual systems, cultural contexts, and value logics behind linguistic signs, instructional content can support higher-level cognitive operations, thereby achieving the internalized generation of meaning and the multidirectional expansion of viewpoints [3].

The construction of thinking-expansion structures can be developed through the coordinated integration of three dimensions: "language–cognition–culture." The language module provides a foundational representational system; the cognitive module builds logical processing pathways; the cultural module introduces mechanisms for value comparison and perspective shifting. The interactive configuration among these modules not only enhances the systematicity and generativity of content but also promotes the dynamic embedding of thinking into linguistic material. Instructional content should not function as static input but as a vehicle for semantic exploration, viewpoint construction, and logical generation. Through thematic integration, text reconstruction, and argumentative writing, teaching content can be transformed into cognitively stimulating scaffolding, forming a content-driven structure for the evolution of thought.

2.3 Multidimensional Thinking Generation Patterns in Instructional Interaction

Instructional interaction serves as a critical stage for the deep coupling of language input/output and cognitive processing mechanisms. In multidimensional interactions, learners participate in constructing discourse structures with innovative features through role-playing, viewpoint negotiation, and semantic collaboration. In high-complexity contexts, interaction is no longer a mere process of information exchange but a dynamic process in which cognitive collaboration and pragmatic construction occur in

parallel. The effectiveness of instructional interaction depends on the development of discourse coordination abilities between teachers and learners, particularly in guiding language focus, stimulating thinking pathways, and strategically intervening in context transitions. This process helps establish a thinking generation field centered on exploratory language practice.

Multidimensional thinking generation patterns emphasize the synchronous evolution of interlingual tension and cognitive mutation. Through strategies such as role switching, context shifting, and task restructuring, students are prompted to continuously adjust their linguistic strategies and attempt cognitive leaps during interaction. Incorporating variable-structure discussion tasks, collaborative writing, or impromptu expression into instructional design can effectively disrupt the stable inertia of language production, fostering a bidirectional evolution of expressive forms and thinking mobilization strategies. The spontaneous sentence construction, viewpoint highlighting, and semantic transfer phenomena that emerge in language interaction mark the activation and expressive energy of innovative thinking, whose pragmatic effect far surpasses the cognitive depth and expressive tension achievable through one-way transmission [4].

3. Optimization of Teaching Mechanisms Under the Guidance of Innovative Thinking

3.1 Innovative Reconfiguration of the Instructional Assessment System

In college English teaching, traditional assessment models often focus on the mastery of language knowledge and the standardized performance of skills, such as grammatical accuracy, lexical richness, and language fluency. Although such assessment systems offer advantages in terms of operability and measurable outcomes, they fall short in reflecting the depth of thinking and the originality of expression exhibited by students during the language construction process. Under the guidance of innovative thinking, the assessment mechanism urgently needs to shift toward a multidimensional evaluation structure that integrates both language performance and cognitive processes, emphasizing students' abilities in information reorganization, logical reasoning, and semantic expansion during task completion. Only by incorporating thinking characteristics into the assessment system can the cognitive dimensions and creative outcomes of language learning be accurately measured.

An innovation-oriented assessment system should emphasize a dual mechanism combining process-based documentation and generative outcome evaluation. Process-based documentation can visualize students' thinking generation pathways through the trajectory of task completion, revision marks, and discourse construction processes; generative outcomes focus on dimensions such as the uniqueness, logicality, and intercultural adaptability of students' language output. For instance, in argumentative writing tasks, assessments should consider whether students present multi-perspective viewpoints and whether they demonstrate strategic thinking and semantic depth in their language expression. Such evaluations should rely on a multidimensional indicator system, including linguistic flexibility, originality of expression, structural tension, and coherence of ideas, in order to strengthen the mapping mechanism between language output and cognitive ability.

The integration of information technology provides technical support for the assessment system. Intelligent diagnostic systems can quantitatively analyze linguistic patterns, logical chains, and rhetorical strategies in student texts, and—combined with natural language processing techniques—dynamically track indicators such as discourse complexity and cognitive leaps. Meanwhile, incorporating methods such as peer assessment, reflective journals, and multi-round feedback transforms assessment from "evaluating students" to "guiding development," thereby achieving teaching objectives that promote learning and stimulate thinking through assessment. By constructing an assessment system that is structurally flexible, multidimensionally oriented, and functionally targeted, college English instruction can effectively play its regulatory and facilitative role in the cultivation of innovative thinking [5].

3.2 Structural Shift in Teachers' Thinking Guidance Ability

Teachers in the instructional system serve not only as intermediaries for knowledge transmission but also as organizers of thinking generation and guides of cognitive structures. Teaching oriented toward innovative thinking imposes higher cognitive guidance demands on teachers, especially in areas such as problem construction, situational design, and the elicitation of language strategies. Teachers must possess the ability to design highly challenging tasks, guide students in constructing multiple perspectives, and recognize the cognitive potential underlying linguistic structures. During instruction,

teachers promote students' self-expansion of thinking pathways by triggering cognitive conflicts, posing ambiguous questions, and activating semantic boundaries, thereby facilitating the cognitive leap from receptive learning to constructive learning.

Guidance strategies need to shift from surface-level linguistic drills to deeper mobilization of thinking processes. This structural shift manifests in the reconstruction of classroom interaction patterns, such as replacing closed-ended questions with open-ended inquiries, substituting viewpoint guidance for grammar correction, and prioritizing reflective responses over evaluative judgments. Teachers' discourse design should demonstrate logical permeability, semantic activation, and cognitive generativity, leading students to continuously adjust the dynamic relationship between language form and thought content during expression. Meanwhile, students should be encouraged to develop pathways of self-questioning, autonomous transfer, and multidirectional thinking expression, gradually establishing the intrinsic logic and cognitive tension of innovative expression in their language production [6].

Enhancing teachers' thinking guidance ability also requires support from a structured professional development system. Teacher training should cover cutting-edge fields such as cognitive psychology, thinking visualization, task-based instructional design, and multimodal corpus application, equipping teachers with the professional competence to extract thinking logic from instructional tasks and diagnose cognitive abilities from students' language. Moreover, sustained mechanisms based on peer collaboration, case reflection, and instructional observation help teachers optimize guidance strategies, adjust discourse structures, and strengthen the construction of classroom cognitive ecology in practice. The transformation of the teacher's role will ultimately reshape the cognitive structure of the classroom and provide continuous, systematic guidance to support the generation of innovative thinking.

3.3 Design of Cognitive Activation Mechanisms in the Teaching Environment

The generation of innovative thinking depends on a teaching environment characterized by cognitive challenge, interactive flexibility, and resource openness. College English classrooms should transcend the static, lecture-based physical spaces and the linear distribution of content, building a cognitive generation environment that features semantic diversity, structural variability, and task nesting. Within this environment, language learning activities must be embedded in authentic or simulated contexts, guiding students to continuously engage in cognitive adjustment and expressive reorganization amid semantic ambiguity, viewpoint conflicts, and situational shifts, thereby achieving the synchronous evolution of linguistic and cognitive behaviors. The teaching environment no longer serves as a mere backdrop for information delivery but functions as a generative platform integrating cognitive structure construction with language practice.

Effective cognitive activation mechanisms rely on the organized design of multimodal resources. Diverse corpora such as videos, images, charts, and interactive texts can expand students' boundary cognition of language and knowledge, enhancing their abilities in information interpretation and cross-modal transfer. Meanwhile, task structures should be adjustable and non-preset, requiring learners to filter information, restructure frameworks, and innovate semantically when confronted with uncertain linguistic contexts, thus forming context-based dynamic thinking mobilization. By introducing cognitive tools such as interactive platforms, semantic maps, and intelligent corpora, the teaching environment can be transformed into a cognitive operating system equipped with strategy generation and iterative thinking functions.

Cognitive activation in the teaching environment also depends on the meticulous design of interaction structures. In collaborative learning, role-playing, and viewpoint dialectics, students must make perspective choices, reorganize language, and coordinate logic during verbal expression, thereby stimulating multidirectional thinking collisions within collective contexts. Teachers should establish highly supportive, immediate-feedback, and effectively motivating interaction mechanisms to ensure the cognitive density and thinking tension of language interaction. On this basis, the cognitive activation mechanism will no longer rely on isolated teaching behaviors but will be jointly driven by the dynamics of corpora, variability of interaction, and constructiveness of context, fostering the deep generation of students' innovative thinking.

Conclusion

Based on an analysis of the cognitive structure of innovative thinking, this study proposes

embedding pathways for task design, content construction, and interaction strategies in college English teaching. It establishes a teaching model centered on language generation and aimed at thinking activation, while offering structural optimization suggestions at the levels of assessment mechanisms, teacher guidance, and the teaching environment. The study indicates that the generation of innovative thinking depends on the language system's capacity for structural variation and the cognitive system's mechanism for resource mobilization, with the coupling of these two factors serving as the key driving force for teaching reform. Future research may further explore the application of thinking visualization technologies in language learning under artificial intelligence-assisted conditions, aiming to build more precise cognitive tracking and dynamic regulation systems. Meanwhile, the differences in thinking cultivation pathways across various professional backgrounds, cultural contexts, and learning types warrant in-depth analysis, so as to promote personalized development and cross-domain integration of college English education under diverse cognitive structures.

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