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Towards a Sustainable Cognitive Ecosystem in Language Education: Abstract and Strategic Thinking in CECL Activity Design

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Abstract: The *Communicative English for Chinese Learners* (CECL) coursebook series, edited by Li Xiaoju, represents a landmark in language education by integrating cognitive development into activity design. This paper examines how CECL cultivates two higher-order cognitive capacities, namely, abstract thinking and strategic thinking, through its activity typology and organizational structure. Abstract thinking enables learners to extract concepts, build symbolic systems, and construct logical frameworks, while strategic thinking supports goal-oriented decision-making, scenario simulation, and adaptive communication. Although theoretically distinct, these two thinking modes are dialectically interwoven in CECL. Descriptive activities provide the cognitive foundation for abstraction through naming, symbolizing, and concept-networking. Social and hybrid activities serve as platforms for strategic thinking, requiring learners to analyze communicative situations, simulate outcomes, optimize choices, and adjust in real time. The paper argues that CECL constructs a sustainable cognitive ecosystem where abstract and strategic thinking reinforce each other in a spiral of ascending complexity. This design transcends traditional skill-based training and offers a paradigm for language education as holistic cognitive empowerment.

Keywords: CECL; Abstract thinking; Strategic thinking; Cognitive ecosystem; Activity design

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1. Introduction

In contemporary language education, CECL stands out for its unique activity types, structural sequencing, and underlying cognitive philosophy. CECL treats language not merely as a communicative tool but as a vehicle for cognitive development [1–6]. This paper explores how two higher-order cognitive abilities, abstract thinking and strategic thinking, are embedded in CECL's activity design and how their interaction fosters holistic language competence.

Abstract thinking and strategic thinking are often treated as distinct cognitive capacities. Abstract thinking concerns concept extraction, pattern recognition, and the construction of logical structures; strategic thinking focuses on dynamic decision-making, multi-stage simulation, and adaptive goal achievement. Despite their functional differences, CECL weaves them into a mutually supportive, co-evolutionary relationship.

The revolutionary significance of CECL lies in its creation of a cognitive ecosystem that guides learners from concrete experience to abstract concepts, and then from abstract concepts to strategic application. Descriptive activities build multidimensional cognitive networks for abstract thinking, while social and hybrid activities provide authentic communicative contexts for strategic thinking. The interplay of these two capacities makes CECL not only a medium for language learning but also a driver for cognitive growth.

2. Theoretical distinctions between abstract and strategic thinking

2.1. Nature and structure of abstract thinking

Abstract thinking refers to the ability to detach from concrete sensory experience and transform diverse empirical data into general rules and structural models through conceptualization, symbolization, and logical deduction. Its core lies in discovering commonalities and regularities behind phenomena, thereby simplifying complex systems into operational knowledge structures.

Abstract thinking consists of three core processes–concept extraction (identifying invariant patterns from instances), symbolization (transforming concepts into transmissible symbolic systems), and structural deduction (systematizing conceptual relations to generate new knowledge), which together enable the construction of universal cognitive frameworks. Characterized by context-independence, formalization, internal consistency, and transferability, abstract thinking manifests in language learning as the generalization of grammatical rules, pragmatic principles, and discourse patterns.

2.2. Core mechanisms of strategic thinking

Strategic thinking is goal-oriented, forward-looking, and dynamically adaptive. It operates under multi-variable and uncertain conditions through planning, prediction, and adjustment to achieve optimal decision sequences. Formally, it can be represented as an optimization problem: selecting the best path under given objectives and constraints.

Its four key components are: system analysis (identifying critical variables and constraints), scenario simulation (predicting outcomes under different assumptions), decision optimization (choosing the utility-maximizing strategy), and feedback adjustment (revising strategies based on outcomes). In communication, strategic thinking appears as the ability to flexibly select and adjust expression strategies according to audience, purpose, and situational constraints [7,8]. Hence, while abstract thinking emphasizes correctness of cognition, strategic thinking emphasizes effectiveness of action.

3. Implementing abstract thinking in CECL activity design

3.1. Concept extraction and symbolization in descriptive activities

In lower-level CECL units, descriptive activities guide learners from concrete experience to concept extraction. For example, in the “Colors and Shapes” theme, the first five descriptive activities approach the concept from naming, perception, and cultural angles, building basic facts and vocabulary. Activity 1 introduces naming, definition, classification, and historical/cultural origins, completing the first leap from perception to abstraction.

As units progress, descriptive activities increase in complexity, moving from simple concept extraction to relational network building. In the “Population” theme under “Social Problems,” five descriptive activities plus Activity 6.1 construct theme meaning from multiple dimensions: issues, viewpoints, concepts, principles, and cultural background. This multidimensional networking creates rich abstract cognitive structures that support deep language use.

3.2. Structuring and systematizing abstract thinking

In advanced units, descriptive activities emphasize concept-, principle-, and process-oriented knowledge. The “Government” theme sequence builds theme meaning across general cognition, core concepts, underlying principles,

case studies, and language use. This process corresponds to structural deduction in abstract thinking, integrating isolated concepts into a systematic knowledge framework.

CECL's ten subtypes of descriptive activities correspond to different dimensions and developmental levels of abstract thinking [9]. From lower-level dominant types (situational, linguistic, naming, symbolic) to higher-level dominant types (conceptual, principle, experiential, procedural), a clear cognitive progression emerges from concrete encoding to abstract thinking. This structured organization enables systematic development of abstract reasoning, laying a solid cognitive foundation for complex communicative tasks.

4. Embedding strategic thinking in CECL activity design

4.1. Strategy selection and optimization in social activities

Social activities in CECL are concentrated in two core units: "Dealing with People" and "Getting Things Done". This distribution reflects a concentrated training strategy for strategic thinking. In these activities, learners must analyze specific communicative situations and execute optimal strategies.

Take the invitation function in the "Social Events" unit. Before practicing "giving and receiving invitations", CECL provides several prior descriptive activities as metacognitive preparation. Acts 1&2 focus on spoken invitations through 12 conversational examples across different social and cultural contexts. Act.4 addresses written invitations, providing templates for different situations. This sequence embodies system analysis and scenario simulation: learners first analyze key variables and constraints, then simulate possible outcomes, and finally select and execute the optimal strategy.

4.2. Dynamic decision-making in hybrid activities

Hybrid activities serve as "critical generative nodes," drawing on knowledge types from the cognitive resource network and communication strategies from the "communicative gene pool." In lower-level units, hybrid activities often adopt a "communicative scaffolding" model (e.g., role-play asking/telling time). Here, communication is the goal and cognition the means. In advanced units, hybrid activities transform into "cognitive synthesis exercises." Topics such as "ecology ecosystems," "population control" require learners to integrate multidimensional knowledge and formulate effective communication strategies for specific audiences and purposes. In these activities, the relationship reverses: cognition becomes the subject, communication the carrier. Complex cognitive constructions need to be expressed and shared, while social functions ensure appropriateness and effectiveness [10].

4.3. Transfer and recurrence of strategic thinking across units

Strategic thinking is reinforced through cross-unit recurrence and transfer. Social functions are intensively trained in two units and recur in other units. The basic social function "meeting and introducing people," first trained in Unit 1, reappears in diverse contexts: help-seeking, invitations, welcome/farewell parties. As themes expand, these functions evolve into more complex discourse dimensions: business advertising, doctor-patient interviews, job interviews and more.

This cross-unit mechanism enables learners to expand and deepen strategic thinking, moving from simple, standard situations to complex, authentic environments. Learners internalize not only specific strategies but also the methodology of strategic thinking: analyzing situations, setting goals, selecting tools, evaluating outcomes, and adjusting dynamically.

5. The synergistic ecosystem and spiral development

5.1. Cognitive integration

In CECL's cognitive ecosystem, abstract and strategic thinking assume complementary functions while tightly coupling to support complex communicative acts. Abstract thinking builds the cognitive resource network, providing conceptual foundations and reasoning frameworks. Strategic thinking tests strategy optimization, offering application scenarios and

feedback. In the "Generation Gap" unit, for example, descriptive activities (sociological/psychological interpretations, readings on China's generation gap) provide theoretical tools and conceptual frameworks for abstract thinking. The integrated activity (role-play) then requires learners to flexibly apply these concepts in simulated intergenerational communication, cultivating strategic thinking. The two modes form a cognitive relay, supporting the full arc from theoretical understanding to practical application.

5.2. Spiral ascending development

The co-development of abstract and strategic thinking in CECL is not linear but spiral. In lower-level units, abstract thinking focuses on concrete concept extraction and symbolization, supporting basic communication strategies. In advanced units, abstract thinking evolves into inductive and deductive system-building, guiding complex strategic communication. Correspondingly, lower-level strategic thinking emphasizes mastery of standardized communication; advanced strategic thinking demands creative, adaptive strategy formulation.

Take the invitation function again. In lower units, learners master basic sentence patterns and politeness norms through descriptive activities (abstract) and practice them in social activities (strategic). In advanced units, they analyze cross-cultural differences in invitation behavior (abstract) and flexibly adjust strategies in intercultural contexts (strategic). The same function recurs at higher cognitive levels, and the same strategy reappears in more complex dimensions, exemplifying spiral progression.

6. Implications for language education innovation

CECL's integration of abstract and strategic thinking offers important lessons for contemporary language education.

First, language teaching should move beyond form-focused accuracy training toward holistic cognitive development. Through carefully sequenced activity systems, the language classroom can simultaneously serve as a site for thinking skills cultivation.

Second, CECL reveals the dialectical relationship between knowledge construction and competence practice. Descriptive activities provide essential cognitive tools for thinking. Social and hybrid activities are strategic thinking practice in authentic situations. Finally, CECL constructs a sustainable cognitive ecosystem where abstract and strategic thinking emerge naturally through activity participation. This generative learning model equips learners not only with specific linguistic knowledge and communicative skills but also with higher-order cognitive capacities to adapt to new situations and solve novel problems, laying a foundation for lifelong learning.

7. Conclusion

In CECL's activity design, abstract thinking and strategic thinking form a cognitive ecosystem that supports language development through unique organizational structures and dynamic interactions. Abstract thinking provides rich cognitive resources and conceptual frameworks. Strategic thinking supplies effective strategy selection and adaptation mechanisms. The dialectical unity of these two thinking modes transforms language learning from mere symbol mastery or skill training into a vehicle for higher-order cognitive development. The logical consistency of abstract thinking and the goal effectiveness of strategic thinking co-evolve in communicative practice, driving learners from apprentice to autonomous communicators.

The enduring value of the CECL model lies in its deep structure, a structure that continuously generates effective learning experiences. In this structure, abstract and strategic thinking are a dynamically coupled system through relay and network relations. Understanding this deep structure provides theoretical foundations and practical models for integrating language and thinking development in new educational contexts.

Disclosure statement

The author declares no conflict of interest.

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