A Study on the Construction of the "Six-Element Synergy" Teaching Model of Vocational Undergraduate English Driven by Large Language Models

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Abstract: *The technological evolution of large language models provides technical support for the reconstruction of vocational undergraduate English teaching forms, and it also raises higher demands for the collaborative integration of multiple elements. This study focuses on the composite goals of vocational undergraduate English teaching in terms of language ability cultivation, professional language application, and learning autonomy development, and it constructs a teaching model driven by large language models and centered on the "Six-Element Synergy". The study clarifies the intrinsic alignment between the technical features of large language models and the teaching needs, analyzes the composite nature of the teaching objectives, and reveals the breakthrough of the "Six-Element Synergy" over traditional teaching paradigms. On this basis, the study explains the distributed reconstruction of teaching subject roles, the multimodal integration of resources, and the collaborative organization of activity chains, and it constructs a structural framework comprising the goal level, the element level, the interaction level, and the support level. It also explores the intelligent-driven teaching decision-making mechanism and the multi-directional extension paths of teaching interaction, thereby providing a theoretical framework and an explanation of the operational mechanism for the systematic reconstruction of vocational undergraduate English teaching.*

Keywords: *Large Language Models; vocational undergraduate English; Six-Element Synergy; teaching model; intelligent-driven; teaching system*

Introduction

Vocational undergraduate English teaching bears the dual mission of cultivating language proficiency and fostering professional competencies. Its teaching objectives present composite characteristics of integrating generality with specialty, coordinating linguistic cognition with contextual cognition, and interweaving autonomy cultivation with technology empowerment, which poses structural challenges to the traditional paradigm of a single subject, preset resources, and linear processes. Large language models, with their technical features such as semantic coherence maintenance, dynamically adapted input, and multi-dimensional real-time feedback, provide the technical foundation for transforming the teaching system from one-way transmission to collaborative construction. However, technology embedding alone does not constitute a sufficient condition for paradigm innovation, and the collaborative integration of multiple subjects, multiple types of resources, and multiple links becomes the core issue in constructing a teaching model. This study proposes the "Six-Element Synergy" teaching model, which incorporates teachers, learners, intelligent agents, industry mentors, learning communities, and curriculum developers into a collaborative subject network, integrates preset and generative resources, and constructs an operational mechanism that embeds diagnosis, evaluation, and feedback into the teaching process, thereby providing a theoretical framework for the systematic reconstruction of the teaching system oriented towards composite teaching objectives.

1. The Logical Starting Point for the Reconstruction of Vocational Undergraduate English Teaching Forms

1.1 Analysis of the Suitability of Large Language Models' Technical Features for Teaching Embedding

1.1.1 The Alignment between Semantic Coherence Maintenance Ability and Contextualized Language Acquisition

The context maintenance ability demonstrated by large language models in multi-turn dialogue interactions enables them to maintain the coherence of semantic logic and the naturalness of topic transitions during continuous interactive processes. This technical feature exhibits an inherent alignment with the contextualized language acquisition emphasized in vocational undergraduate English teaching. Learners, through their interaction with the technical system, are able to experience the complete process of context construction, maintenance, and transformation, thereby forming a deep understanding of the relationship between linguistic forms and contextual cues in simulated real-life language use scenarios.

1.1.2 The Dynamic Adaptive Input Mechanism and the Precise Response to Learner Differences

The technical mechanism that adjusts the complexity of input texts and the density of professional terminology in real time based on learners' language production characteristics enables large language models to overcome the limitations of traditional teaching resources in terms of individual adaptability. In the field of vocational undergraduate English teaching, this dynamic adaptive ability can respond to the significant differences among learner groups in terms of language foundation, professional background, and learning pace, thereby achieving a precise match between language input and learners' current proficiency levels.

1.1.3 Multi-dimensional Real-time Feedback Function and the Refined Cultivation of Language Skills

The multi-dimensional evaluation of learners' language production by large language models covers aspects such as grammatical accuracy, expressive fluency, stylistic appropriateness, and the normative use of professional terminology. This real-time, multi-dimensional feedback mechanism can support the need for refined cultivation of language skills in vocational undergraduate English teaching, enabling learners to receive targeted diagnosis immediately after language production and thus forming a closed-loop training process of "output-feedback-revision."

1.2 Analysis of the Composite Characteristics of Vocational Undergraduate English Teaching Objectives

1.2.1 The Integration of Generality and Specialization in the Dimension of Language Competence

The teaching objectives of vocational undergraduate English present a dual orientation at the level of language competence, namely general language competence and professional domain-specific language application ability. The relationship between these two is neither a simple sequential order nor a primary-secondary one; instead, they require organic integration within the teaching system. General language competence provides learners with basic support for language interaction in daily communication and academic settings, while professional domain-specific language application ability addresses the needs of technical communication and industry interaction in specific vocational fields.

1.2.2 The Synergy between Linguistic Cognition and Contextual Cognition in the Cognitive Dimension

The teaching objectives of vocational undergraduate English at the cognitive level involve three tiers: the mastery of the linguistic symbol system, the linguistically expressed representation of professional knowledge, and the understanding of language norms in vocational contexts. Linguistic cognitive ability constitutes the foundational tier, professional cognitive ability facilitates the integration and transformation of knowledge and language, and contextual cognitive ability ensures learners' understanding of and adherence to language use rules in different vocational scenarios. The synergistic development of these three cognitive abilities constitutes the composite characteristic of teaching objectives in the cognitive dimension.

1.2.3 Autonomy Cultivation and Technology Empowerment in the Dimension of Competencies

The teaching objectives of vocational undergraduate English also include the requirement for cultivating learner autonomy in language learning, which refers to learners' ability to form self-diagnosis, self-regulation, and self-expansion in language learning within a technology-empowered teaching environment. The establishment of this competency goal responds to the inherent demand in vocational fields for practitioners' continuous learning ability, and it simultaneously forms a mutually supportive relationship with the personalized learning paths and adaptive learning support provided by the technological system.

1.3 The Breakthrough of the "Six-Element Synergy" Concept over the Traditional Teaching Paradigm

1.3.1 The Transcendence of the Binary Opposition Structure through Multi-Synergy in the Subject Dimension

The "Six-Element Synergy" concept incorporates teachers, learners, intelligent agents, industry mentors, learning communities, and curriculum developers into a collaboratively operating subject network, thereby breaking the binary opposition structure of teaching and learning in the traditional teaching paradigm. Each subject undertakes differentiated functional roles in the teaching process, and the subjects achieve functional complementarity and integration through interactive processes, forming a distributed subject relationship network rather than a unidirectional chain of delivering and receiving.

1.3.2 The Breakthrough of the Monopoly of Preset Resources through the Dynamic and Static Integration in the Resource Dimension

This concept breaks the monopoly of preset resources and incorporates textbook resources, generative resources, contextual resources, interactive resources, and industry corpus resources into a framework of collaborative integration. Static resources and dynamic resources complement each other, and preset content and generative content transform into each other, thereby forming a multi-source convergence mechanism within the resource ecology, which shifts teaching resources from a closed preset system to an open, growing system[1].

1.3.3 The Resolution of the Separation between Evaluation and Teaching through the Embedded Integration in the Evaluation Dimension

The "Six-Element Synergy" concept incorporates diagnostic evaluation, formative evaluation, and performance evaluation into a collaborative framework, thereby breaking the traditional pattern of separation between evaluation and teaching. Evaluation is no longer regarded as a summative judgment after the completion of teaching; instead, it becomes an intrinsic link embedded in the teaching process. Through the aggregation and calibration of multi-source evaluation data, it achieves continuous tracking and dynamic diagnosis of learners' language competence development process.

2. The Element Structure and Interaction Mechanism of the "Six-Element Synergy" Teaching System

2.1 The Distributed Reconstruction of Teaching Subject Roles

2.1.1 The Transformation of Teacher Functions from Knowledge Transmission to Collaborative Guidance

In the "Six-Element Synergy" framework, the function of teachers transforms from knowledge transmitters to collaborative guides of the teaching system, and they undertake tasks such as goal setting, context creation, interaction regulation, and value guidance. This transformation requires teachers to possess the ability to understand the operational logic of the technological system, the capacity to grasp the interaction rhythm of multiple subjects, and the decision-making ability to dynamically adjust the teaching process, thereby playing a pivotal role in the distributed subject network.

2.1.2 The Functional Transition of Intelligent Agents from Tool Attributes to Interactive Subjects

Intelligent agents driven by large language models transcend the traditional role positioning of technical tools within the "Six-Element Synergy" system, and they undertake subjective functions such as language interaction partners, learning path planners, and instant feedback providers. Through

semantic analysis and cognitive diagnosis of learners' language production, intelligent agents generate personalized interaction strategies and learning suggestions, thereby forming a sustained dialogic relationship with learners. This functional transition enables intelligent agents to become subject elements with relatively independent functions in the teaching system, and they form collaborative relationships of functional complementarity with other subjects.

2.1.3 The Collaborative Embedding Mechanism of Learning Communities and Industry Mentors

The learning community undertakes the functions of peer interaction, collaborative construction, and experience sharing in the "Six-Element Synergy" system, and it forms a horizontal support network among learners. Industry mentors, on the other hand, provide professional guidance from the dimensions of authenticity and normativity in vocational language use, and they introduce the language use standards from the industry field into the teaching system. The two types of subjects achieve collaborative embedding during the system's operation: the learning community provides a practical field for the guidance of industry mentors, and industry mentors provide professional orientation for the activities of the learning community, thereby forming a subject structure in which vertical guidance and horizontal collaboration support each other.

2.2 Multimodal Integration and Dynamic Adaptation of Teaching Resources

2.2.1 The Semantic Integration of Textual, Speech, and Image Resources

The "Six-Element Synergy" teaching system deeply integrates multimodal resources driven by large language models at the semantic level, and it incorporates textual resources, speech resources, and image resources into a unified semantic representation framework. Textual resources carry conceptual knowledge and logical structures, speech resources provide perceptual input of the sound form of language, and image resources present contextual information and spatial relationships. The three types of resources achieve correlation and complementarity at the semantic level, and they form a multidimensional resource form that transcends the limitations of a single modality, thereby providing learners with multiple channels of language input and cognitive processing paths.

2.2.2 The Dynamic Transformation Mechanism between Preset Resources and Generative Resources

During the system's operation, a dynamic transformation relationship forms between preset teaching resources and generative teaching resources. Preset resources provide the basic framework and content support for the conduct of teaching activities, while generative resources are continuously produced during the interaction process and enter the resource system; after being filtered, integrated, and structurally processed, these resources are transformed into effective resources that can be invoked for subsequent teaching. This transformation mechanism keeps the teaching resource system open and growing, and the resource content is continuously enriched and optimized as the teaching interaction deepens[2].

2.2.3 The Transformation Path from Industry Corpus Resources to Teaching Resources

The dependence of vocational undergraduate English teaching on industry corpora requires the system to possess an effective path for transforming industry corpus resources into teaching resources. Large language models, through learning and modeling specific industry corpora, extract characteristic parameters of industry language, including terminology usage patterns, syntactic structure preferences, and stylistic features, and they embed these characteristic parameters into the generation process of teaching resources. This transformation path ensures that teaching resources maintain consistency with actual industry language use in terms of linguistic form, thereby achieving an effective connection between language teaching and vocational needs at the resource level.

2.3 Collaborative Organization and Regulation of the Teaching Activity Chain

2.3.1 The Closed-Loop Structure of Teaching Links and Their Interactive Coordination

The teaching system incorporates six links, namely task design, interactive activities, collaborative learning, instant feedback, evaluation and diagnosis, and teaching regulation, into a closed-loop structure, and each link forms a nonlinear interactive and coordinative relationship. Task design provides the framework for interactive activities, the behavioral data from interaction enter the feedback and evaluation links, the evaluation results trigger teaching regulation, and the regulation strategies in turn optimize the task design, thus forming a self-regulating cyclic operation pattern.

2.3.2 The Functional Articulation of Multiple Subjects in the Activity Chain

The collaborative operation of the teaching activity chain relies on the functional articulation of multiple subjects, including teachers, intelligent agents, learners, and industry mentors, across different links. Teachers lead the task design and teaching regulation links, intelligent agents undertake the functions of instant feedback and evaluation and diagnosis, learners play the main role in the interactive activities and collaborative learning links, and industry mentors provide referential standards from the professional dimension in the evaluation and diagnosis link. Each type of subject has a clear division of labor in each link, and the subjects also support each other, thereby forming a functional integration mechanism for the overall operation of the activity chain.

2.3.3 The Self-Adaptive Regulation and Path Optimization of the Activity Chain

Based on the analysis of learner behavioral data by large language models, the system can continuously monitor and self-adaptively regulate the operational status of the teaching activity chain. When a learner encounters cognitive obstacles or shows a decline in participation at a certain link, the system adjusts the presentation mode, content difficulty, or interaction rhythm of subsequent links, thereby achieving real-time optimization of the activity chain's operational path. This self-adaptive regulation mechanism prevents the teaching activity chain from being ossified into a preset procedural sequence; instead, it allows the chain to adjust dynamically according to learners' actual states, thereby maintaining a continuous match between teaching activities and learner needs.

3. The Structural Design and Operational Mechanism of the "Six-Element Synergy" Teaching Model

3.1 The Structural Framework of the Teaching Model and the Hierarchical Correlations

3.1.1 The Integration and Unification of Multidimensional Teaching Demands by the Goal Level

The goal level, serving as the top-level design of the teaching model framework, incorporates four types of objectives, namely language competence development, professional language application, cognitive synergy development, and learning autonomy cultivation, into a unified framework, and it establishes the hierarchical relationships and transformation paths among the sub-objectives. This level provides directional guidance for the operation of the teaching system, and it simultaneously establishes reference benchmarks for the construction and evaluation of the other levels.

3.1.2 The Functional Positioning and Configuration Relationships of Multiple Components at the Element Level

The element level covers six core components, namely subject, resource, context, path, evaluation, and feedback, and each component undertakes a differentiated functional positioning. The subject component is responsible for initiating and advancing teaching activities, the resource component provides material support, the context component constructs the field conditions for language acquisition, the path component sets the procedural sequence for implementation, the evaluation component realizes the diagnosis of learning outcomes, and the feedback component completes the transformation of diagnostic information into teaching regulation. The six types of components form a configuration relationship of mutual support, and the functioning of a single component depends on the collaborative coordination of the other components.

3.1.3 The Bidirectional Coupling Mechanism between the Interaction Level and the Support Level

The interaction level carries the dynamic interaction and collaborative operation of the six types of elements during the teaching process, and the support level consists of a technical support system and a mechanism guarantee system, which provide the infrastructure and rules for the operation of the interaction level. The two levels form a bidirectional coupling mechanism: the support level defines the activity boundary and operation mode of the interaction level, and the demand information generated during the operation of the interaction level drives the support level to optimize the system and adjust the rules[3].

3.2 The Intelligent-Driven Teaching Decision-Making and Dynamic Regulation Mechanism

3.2.1 Semantic Analysis and Diagnosis Based on Learning Behavioral Data

Large language models perform semantic analysis on behavioral data generated by learners during

interaction, including language input, question-and-answer records, and task performance, and they extract performance characteristics in dimensions such as language accuracy, expressive fluency, normative use of terminology, and stylistic appropriateness. Through the temporal analysis of multi-round interaction data, the system identifies the trajectory of learners' competence development and their cognitive bottlenecks, thereby forming a dynamic diagnosis of their language state[4].

3.2.2 Teaching Path Planning Based on the Aggregation of Multi-Source Information

The intelligent-driven mechanism aggregates and integrates multi-source information, including the diagnostic results of learner status, teaching objective requirements, resource supply conditions, and time constraints, and it generates differentiated teaching path planning schemes within a constraint satisfaction framework. The path planning covers dimensions such as the sequencing of content, the selection of activity types, the setting of interaction rhythm, and the configuration of support strategies, thereby forming personalized teaching plans that adapt to learners' individual characteristics, and it makes real-time adjustments as the learner's status changes.

3.2.3 Timing Selection and Strategy Generation for Teaching Intervention

Based on the predictive analysis of learners' learning status and development trends, the intelligent-driven mechanism determines the optimal timing for teaching intervention and generates corresponding teaching strategies. The intervention strategies include the provision of cognitive scaffolds, the adjustment of task difficulty, the conversion of interaction modes, and the optimization of resource presentation forms, and the selection of strategies follows the principle of matching the learners' current status, thereby enabling teaching regulation actions to take effect at the moments when learners' needs are most urgent.

3.3 The Multi-Directional Extension and Ecological Evolution of Teaching Interaction

3.3.1 The Interactive Integration between the Classroom Field and Virtual Space

The teaching model breaks through the physical boundaries of the traditional classroom field, and it achieves integration and coordination between classroom teaching and virtual interactive spaces. The classroom field carries face-to-face teacher-student interaction and peer collaboration, while the virtual space extends the temporal and spatial dimensions of teaching interaction, supporting sustained dialogue between learners and intelligent agents, learning communities, and industry mentors, thereby forming an organic integration of centralized classroom learning and distributed extracurricular learning[5].

3.3.2 The Integration and Permeation of Vocational Contexts and Teaching Contexts

The teaching model achieves the integration and permeation of vocational contexts and teaching contexts through such pathways as the transformation of industry corpus resources, the embedding of vocational language features, and the participation of industry mentors. The language use rules, communication conventions, and professional terminology systems from vocational contexts are introduced into the teaching interaction process, thereby ensuring that the language forms learners encounter and use remain consistent with those in the vocational field. The language competence developed in the teaching context is then tested and reinforced through vocational context simulation activities[6].

3.3.3 The Evolutionary Trend of the Teaching System toward an Open Ecosystem

During its continuous operation, the teaching model exhibits the characteristic of evolving from a closed teaching system toward an open teaching ecosystem. The system boundaries gradually become blurred, and external resources and subjects are continuously absorbed into the system, while the internal interaction network becomes increasingly complex and diverse. Learners transform from passive recipients into participants and drivers of system evolution, and their learning behavioral data and interaction records become important inputs for system optimization, thereby enabling the teaching model to achieve form renewal and functional improvement through a continuous self-organization process.

Conclusion

This study systematically constructs the "Six-Element Synergy" teaching model of vocational undergraduate English driven by large language models from three levels: the logical starting point of

teaching form reconstruction, the element structure and interaction mechanism of the teaching system, and the structural design and operational mechanism of the teaching model. The study reveals the intrinsic alignment between the technical features of large language models and the teaching objectives of vocational undergraduate English, and it clarifies the breakthrough paths of the "Six-Element Synergy" over the traditional teaching paradigm in the dimensions of subject, resource, and evaluation. At the level of element structure, the study specifies the distributed reconstruction of teaching subject roles, the multimodal integration and dynamic adaptation of resources, and the collaborative organization and regulation mechanism of the teaching activity chain. At the level of model construction, the study builds a structural framework comprising the goal level, the element level, the interaction level, and the support level, and it explains the intelligent-driven teaching decision-making mechanism and the multi-directional extension paths of teaching interaction. Future research can further focus on the operational conditions and adaptation mechanisms of this teaching model in specific contexts, explore the differentiated needs of different professional fields and learning stages, and investigate the dynamic evolution paths of the teaching model form against the backdrop of large language model technology advancement.

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