A career-competence-oriented digitally stratified resource library for vocational bachelor English is constructed and applied

Chunlan Xu*

Hainan Vocational University of Science and Technology, Haikou, 571126, China
**Corresponding author: xuchunlan7799@163.com*

Abstract: *The core challenge of vocational bachelor English teaching lies in the transformation from general language knowledge to vocational context application ability. Based on the career-competence cultivation orientation, this study constructs a theoretical framework and an application system for a digitally stratified resource library. By deconstructing career-competence-based teaching objectives, establishing a mapping mechanism between resource stratification and cognitive characteristics, and constructing a career-scene-driven competence transformation model, this study lays the theoretical foundation for resource library construction. Using semantic network technology to achieve fine-grained resource classification and multi-dimensional indexing, designing a progressively hierarchical module architecture and adaptive combination logic, and constructing interactive learning scenarios based on embodied cognition theory, this study forms the structural design and content organization scheme of the resource library. Furthermore, this study constructs an operation mechanism that includes dynamic diagnosis based on learner profiles, adaptive adjustment of learning paths, and multi-dimensional verification of career-competence achievement, thereby providing a systematic theoretical framework and implementation path for the digital resource construction of vocational bachelor English teaching.*

Keywords: *Career-Competence Orientation; Vocational Bachelor English; Digital Resource Library; Stratified Architecture; Personalized Learning Path*

Introduction

Vocational bachelor education English teaching bears the dual mission of language knowledge construction and vocational application transfer. Traditional resources take knowledge transmission as their core organizational logic and present a rigid form, which makes it difficult to accommodate the significant differences among learners in language proficiency, vocational orientation, and cognitive styles, thus leading to a structural mismatch between resource supply and learning demands. Although digital technology offers the possibility to address this dilemma, existing resource construction mostly remains at the level of form conversion and lacks a systematic response to the logic of career competence cultivation and individualized needs. This study focuses on the construction of a career-competence-oriented digitally stratified resource library for vocational bachelor English. At the theoretical level, it clarifies the inherent adaptation logic between career competence and language resources. At the structural level, it designs a stratified architecture and an adaptive combination mechanism that accommodate individual differences. At the operational level, it establishes a complete closed loop of dynamic adjustment and continuous optimization, thereby providing a resource construction paradigm with both theoretical depth and application validity for vocational bachelor English teaching.

1. Logical path of the adaptation between career competence map and vocational bachelor English resources

1.1 Goal deconstruction and element recomposition of vocational bachelor English teaching under the career competence orientation

In the context of vocational bachelor education, the goal setting of English teaching must break through the single dimension of traditional language knowledge transmission and shift to an in-depth analysis of the constituent elements of compound career competence. Career competence is not an abstract collection of concepts but is embodied as an organic integration of multi-dimensional abilities such as language use, problem solving, and collaborative communication in specific vocational contexts. Based on this, the teaching objectives of vocational bachelor English need to be deconstructed from three levels, namely language knowledge acquisition, vocational context adaptation, and cross-cultural communication, so as to transform the macro-level career competence requirements into observable and measurable specific learning outcomes and to establish a precise correspondence between the language teaching objectives and the competence specifications of vocational posts.

Based on the goal deconstruction, the reorganization of teaching content elements becomes a key link in resource construction. The traditional content organization method, which takes grammatical systems and topic units as its main line, can hardly meet the differentiated demands of career competence cultivation. Therefore, one needs to reintegrate the language knowledge elements, vocational skill elements, and industry context elements according to the demand characteristics of English skills in different vocational fields. The language knowledge elements focus on high-frequency vocabulary, typical sentence patterns, and discourse structures in vocational scenarios. The vocational skill elements cover the comprehensive application of listening, speaking, reading, and writing skills in vocational tasks. The industry context elements point to language communication events in real work processes. The organic reintegration of these three elements provides a clear logical starting point for the content architecture of the digital resource library.

1.2 The mapping mechanism between the stratified architecture of digital resources and learners' cognitive characteristics

The stratified architecture design of digital resources essentially establishes an internal correlation between the resource difficulty gradient and the laws of learners' cognitive development. Learners' language cognitive levels exhibit significant individual differences, which are reflected not only in the different starting points of their basic language ability but also in the diversity of their cognitive styles, learning preferences, and information processing modes. Therefore, resource stratification should not be based merely on a simple division according to language difficulty; instead, it needs to construct a stratified matrix that covers multiple dimensions such as language complexity, task cognitive load, and interaction support intensity. The design of each resource level must correspond to the characteristics of learners at a specific cognitive development stage, ensuring that the resource content not only matches their current cognitive level but also provides an appropriate degree of challenge to facilitate ability improvement.

The mapping mechanism between resource stratification and cognitive characteristics also needs to consider the dynamic changes of cognitive states during the learning process. Learners 'cognitive abilities are not fixed but continue to evolve with knowledge accumulation and skill proficiency. The digital resource library needs to use built-in diagnostic tools and behavior tracking technologies to capture learners' cognitive performance characteristics in real time, including key indicators such as information processing speed, error type distribution, and task completion strategies. Based on these data, the resource stratification system can dynamically adjust the flow path of learners between levels, so that the resource push always matches the individual's current cognitive state. The establishment of this dynamic mapping mechanism effectively avoids the learning adaptation bias that static stratification may cause and improves the accuracy and timeliness of resource supply[1].

1.3 The career-scene-driven transformation model of English application ability

The career-scene-driven transformation model has its core lying in revealing the internal mechanism through which language knowledge transforms into vocational application ability. In the context of vocational education, the purpose of English learning does not stop at the mastery of language forms; instead, it lies in the ability to use the language to complete specific tasks in real vocational situations. This model takes the career scene as the core medium for ability transformation and reproduces typical language communication events in vocational activities through digital means, so that learners can complete the cognitive processing from language input to language output in contextualized tasks. The task attributes, role relationships, communication goals, and other elements in the career scene jointly constitute the triggering conditions and constraint framework for the transformation from language knowledge to application ability.

The operational mechanism of this model is manifested in three progressive stages: knowledge representation, context embedding, and ability externalization. In the knowledge representation stage, language knowledge is organized and presented in a manner associated with vocational contexts, thus forming cognitive schemas with contextual orientation. In the context embedding stage, learners complete interactive tasks in digitally constructed career scenes, and the language knowledge is activated and applied through interaction with contextual elements. In the ability externalization stage, learners demonstrate comprehensive language application ability in simulated vocational tasks, and their behavioral performance becomes observable evidence of ability achievement. The establishment of this transformation model provides a theoretical basis for the design of learning tasks in the digital resource library, enabling the resource content to effectively support the entire process from knowledge acquisition to ability transfer.

2. Structural design and content organization of the digitally stratified resource library

2.1 Resource granularity division and metadata indexing system based on semantic network

The granularity level of resource division directly determines the retrieval efficiency and recombination flexibility of the digital resource library. The introduction of semantic network technology provides methodological support for the scientific division of resource granularity. Unlike the traditional coarse-grained organization method that takes complete texts or units as its basic unit, the division strategy based on semantic network breaks down resources into minimal knowledge units that are semantically complete and logically self-consistent, with each unit carrying a single and clear language knowledge point or vocational skill point. These fine-grained resource units are linked to each other through semantic associations, thus forming a networked knowledge structure, which not only preserves the integrity of the knowledge content but also provides sufficient material reserves for subsequent personalized recombination. The criteria for granularity division need to take into account both the inherent laws of linguistics and the external demands of vocational scenes, ensuring that each resource unit has a clear learning value when used independently and can form an organic knowledge association with other units when used in combination.

The construction of the metadata indexing system serves as the core support for achieving precise resource management and efficient retrieval. This system needs to design indexing items from three dimensions: content features, formal features, and application features. Content feature indexing covers the language difficulty level, vocational field attribution, skill type orientation, and topic category involved in the resource. Formal feature indexing includes technical attributes such as resource form type, interaction mode, duration or length. Application feature indexing records teaching attributes such as the recommended usage level, prerequisite knowledge requirements, and target ability orientation of the resource. All indexing items are encoded using a standardized controlled vocabulary to ensure the consistency and comparability of the indexing results. This multi-dimensional metadata indexing system enables each resource to have a complete semantic description, thereby laying a data foundation for the stratified push, intelligent retrieval, and adaptive combination of the resource library[2].

2.2 The progressively hierarchical resource module architecture and adaptive combination logic

The hierarchical architecture design of resource modules follows the progressive laws of language ability development and the stage characteristics of career competence cultivation. The bottom layer consists of basic language ability modules, which focus on basic vocabulary, core sentence patterns, and common discourse structures in vocational scenes, thereby building the necessary language knowledge reserve for learners. The middle layer consists of general workplace communication modules, which cover typical communication scenarios in the workplace, including task types such as written correspondence, oral reports, and business negotiations, and focus on cultivating learners' language application ability in general vocational contexts. The top layer consists of professional field application modules, which address the professional English needs of specific industry fields and design language tasks deeply embedded in professional work processes, thus achieving a deep integration of language skills and professional abilities. A progressive relationship is formed among the three layers of modules, with the learning outcomes of the lower layer serving as the knowledge prerequisite for entering the upper layer, and the content of the upper layer comprehensively applying and deepening the knowledge from the lower layer.

The construction of the adaptive combination logic enables the resource library to dynamically generate learning paths based on individual learner characteristics. This logic takes learners' ability profiles and learning behavior data as inputs and selects and organizes resource sequences suitable for the current learners from the resource library through preset combination rules and algorithm models. The combination decision needs to comprehensively consider multiple variables, including learners' language proficiency starting level, vocational interest orientation, learning progress performance, and cognitive load characteristics. When a learner demonstrates a high degree of mastery in a certain resource unit, the system automatically adjusts the difficulty gradient of subsequent resources or skips redundant content. When a learner encounters learning difficulties, the system pushes supplementary resources at the same or lower level to provide support. This adaptive combination mechanism transforms the resource library from a static content repository into a dynamic intelligent learning engine, achieving continuous adaptation between resource supply and learner needs.

2.3 The digital embodiment and immersion mechanism of interactive learning contexts

The digital embodiment of interactive learning contexts aims to transform abstract language knowledge into concrete experiential learning content through technical means. Embodied cognition theory indicates that learners' cognitive processing is closely related to their physical perception and environmental interaction. Based on this principle, the digital resource library constructs a learning environment highly similar to career scenes through technologies such as virtual reality, contextual animations, and interactive simulations. Learners participate in language communication activities in the context as roles, and their operational behaviors, language output, and decision-making choices all become key variables in the evolution of the context. This embodied design no longer confines language learning to the processing of textual symbols but integrates multi-dimensional experiences such as context perception, role engagement, and task driving, thereby promoting the transformation of language knowledge into practical application ability[3].

The realization of the immersion mechanism depends on the refined design of interaction intensity and feedback density in the learning context. A high-immersion learning context needs to provide learners with interactive feedback that responds to their behaviors in real time, so that learners can clearly perceive the causal relationship between their own actions and contextual changes. The forms of feedback cover multiple levels, including immediate evaluation of language accuracy, visual prompts of task completion progress, and dynamic responses to contextual role interactions. The design of interaction intensity needs to be differentiated according to the task type and learning objectives: for basic language training tasks, the interaction focuses on the accuracy and normativity of language forms; for comprehensive application tasks, the interaction focuses on strategic selection, problem solving, and the achievement of communication effects. Through the synergistic effect of interactive feedback and contextual evolution, the immersion mechanism effectively maintains learners' cognitive engagement level and enhances the continuity and completeness of the learning process.

3. Embedding and adaptation of the stratified resource library in personalized learning paths

3.1 Dynamic diagnosis based on learner profiles and initial resource allocation

The learner profile serves as the prerequisite foundation for achieving personalized resource allocation, and its construction needs to rely on multi-dimensional diagnostic data. The diagnostic dimensions cover the objective measurement of language proficiency level, the quantitative assessment of vocational interest orientation, and the initial collection of learning behavior characteristics. The language proficiency level obtains quantitative data on learners' vocabulary size, grammar mastery, and reading comprehension ability through graded tests. The vocational interest orientation is categorically labeled according to the learners' chosen professional direction and career development intention. The learning behavior characteristics preliminarily identify learners' information processing preferences and task completion styles through the operation traces in the initial interaction stage. After standardized processing, the diagnostic data from the three dimensions are integrated to form a learner profile with multi-dimensional tags, thereby providing a precise reference basis for initial resource allocation[4].

The logic of initial resource allocation is established on the basis of matching calculation between learner profiles and resource metadata. The allocation algorithm locks the appropriate starting level from the stratified architecture of the resource library according to the language proficiency label in the learner profile; it screens the professional module resources related to the vocational field according to the vocational interest orientation label; and it selects the resource form and interaction mode that match the learner's cognitive style according to the learning behavior characteristic label. The three matching mechanisms work together to generate an initial learning combination that covers three types of resources, namely language foundation, vocational skills, and learning support. This initial allocation is not fixed but serves as the starting point of the learning path, reserving an interface for subsequent dynamic adjustment, thereby ensuring that learners receive resource support that is highly consistent with their own characteristics at the very beginning of the learning process.

3.2 Real-time tracking of learning paths and adaptive adjustment of resource difficulty

The real-time tracking mechanism of learning paths relies on the continuous collection and dynamic analysis of learning behavior data. The tracking system records key behavioral indicators during learners' interaction with resources, including unit dwell time, task completion duration, interaction response speed, error type distribution, frequency of repeated learning, and degree of path deviation. These behavioral data constitute process-based evidence that reflects learners' cognitive states and learning outcomes. Through time-series analysis of behavioral indicators, the system can identify learners' mastery levels on specific knowledge points or skill points, their cognitive load states, and their learning progress speed, thereby providing a decision-making basis for the adaptive adjustment of resource difficulty.

The adaptive adjustment of resource difficulty follows the dual principles of cognitive load matching and learning progress driving. When the tracking data show that learners demonstrate a high accuracy rate and a smooth interaction rhythm on the current resource unit, the system determines that their cognitive load is at an appropriate level and that their learning progress is good; then the system automatically pushes resources with higher complexity at the same level or advances them to the next level module. Conversely, when the data show characteristics such as frequent errors, prolonged dwell time, or repeated interactions on the part of learners, the system determines that they are facing excessive cognitive load and automatically retreats to basic resources at the same level or calls lower-level relevant content to provide supplementary support. The adjustment decision also takes into account learners' historical performance trajectories to avoid frequent level switching caused by a single abnormal fluctuation. This dynamic adaptive adjustment mechanism keeps the learning path always within the zone of proximal development of the individual learner's ability, thereby ensuring the continuity and effectiveness of the learning process[5].

3.3 Multi-dimensional verification of career competence achievement and iterative optimization of the resource library

The verification of career competence achievement requires the construction of an evaluation indicator system covering three dimensions: cognition, skill, and context. The cognitive dimension verifies learners' mastery of language knowledge in vocational scenes, and the assessment is carried out through embedded tests and knowledge graph comparisons. The skill dimension verifies learners' language application performance in simulated vocational tasks, and quantitative scoring is conducted based on task completion quality and the accuracy and appropriateness of language output. The context dimension verifies learners' comprehensive coping ability in complex vocational situations, and the observation is made through multi-round interactive tasks and context simulation results. The verification data from the three dimensions mutually corroborate to form a comprehensive evaluation of learners' career competence achievement, which not only reflects the quantitative level of learning outcomes but also reveals the strengths and weaknesses in the ability structure[6].

The iterative optimization of the resource library is established on the basis of systematic analysis of learning process data and competence achievement data. The optimization mechanism operates on two levels: resource content quality and resource organization logic. At the content quality level, the mechanism identifies resources with significantly high error rates, prolonged dwell time, or notably high frequency of repeated interactions by analyzing the group performance data of learners on specific resource units; it determines that such resources may have problems such as unclear content presentation, inappropriate difficulty setting, or flawed interaction design, and then revises the content or restructures the organization accordingly. At the organization logic level, the mechanism identifies the match between resource stratification and learners' cognitive rules by analyzing the degree of deviation between the actual path of learning trajectories and the preset learning sequence; it then adjusts the difficulty gradient between levels or optimizes the adaptive combination rules accordingly. This iterative optimization mechanism based on empirical data enables the resource library to possess the capacity for continuous evolution, with its structure and functions constantly improving in the process of interaction with learners, thereby maintaining a high degree of alignment with the demands of career competence cultivation.

Conclusion

This study focuses on the construction and application of a career-competence-oriented digitally stratified resource library for vocational bachelor English, and it establishes an overall framework covering theoretical foundation, structural design, and operational mechanism. At the theoretical level, this study deconstructs career-competence-based teaching objectives, establishes a mapping mechanism between resource stratification and cognitive characteristics, and constructs a career-scene-driven competence transformation model, thereby determining the logical starting point for resource library construction. At the structural level, this study uses semantic network technology to achieve fine-grained resource classification and multi-dimensional indexing, designs a progressively hierarchical module architecture and adaptive combination logic, and constructs interactive learning scenarios based on embodied cognition theory, thereby forming the content organization scheme of the resource library. At the operational level, this study establishes mechanisms for initial resource allocation based on learner profiles, real-time tracking of learning paths and adaptive difficulty adjustment, and multi-dimensional verification of career competence achievement as well as iterative optimization, thereby ensuring the dynamic adaptation and continuous evolution of the resource library. This study integrates the career competence map into the logical starting point of resource construction, achieves a deep integration of language learning and vocational cultivation, improves the matching accuracy between resource supply and individual needs through semantic network and adaptive technologies, and endows the resource system with the capacity for continuous evolution through multi-dimensional verification and iterative optimization.

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