Research on the Quality Assurance and Evaluation System for Talent Cultivation in Secondary and Higher Vocational Education Articulation Programs at Vocational Colleges Based on the Sydney Accord Paradigm

Guoxian Zeng*

Urban Vocational College of Sichuan, Chengdu, 610000, China
**Corresponding author: ediwin2026@163.com*

Abstract: *As an important model for supplying technical and skilled talents in vocational colleges, the integrated cultivation of secondary and higher vocational education faces problems such as poor articulation between academic stages, unclear progression of competencies, and fragmented evaluation standards in the systematic construction of its quality assurance and evaluation system. The Sydney Accord paradigm establishes the concepts of outcome orientation, competency basis, and continuous improvement, which provide a referable theoretical framework for quality governance in integrated cultivation. Based on the core competency dimensions of the Sydney Accord paradigm, this study constructs a quality assurance factor identification model and an outcome-based closed-loop mechanism for the integrated cultivation of secondary and higher vocational education. It also designs a quality evaluation system that includes multi-level evaluation standards, a fusion pathway of formative and summative evaluation, and a collaborative feedback network of stakeholders. Furthermore, this study proposes a competency mapping method, the design of teaching monitoring nodes, and a dynamic optimization strategy for cultivation plans driven by evaluation results, thereby forming a three-level integration mechanism. The research aims to establish an operational technical route from goal setting, process monitoring, to plan adjustment for integrated cultivation, and to provide a structured solution for the internal quality governance of integrated cultivation in vocational colleges.*

Keywords: *Sydney Accord paradigm, integration of secondary and higher vocational education, quality assurance, evaluation system, competency mapping, continuous improvement*

Introduction

The integrated cultivation of secondary and higher vocational education occupies an important position in the talent cultivation system of vocational colleges, with its core being the vertical progression of technical and skilled abilities through the organic articulation between academic stages. However, in actual practice, this integrated cultivation often suffers from problems such as repetitive course content, vague competency standards, and isolated evaluation information, which lead to significant fluctuations in cultivation quality. As the benchmark framework for international engineering and technology education accreditation, the Sydney Accord paradigm embodies the logic of outcome orientation and competency basis, which highly aligns with the intrinsic needs of integrated cultivation of secondary and higher vocational education and provides a theoretical reference for the construction of quality assurance and evaluation systems in this field. The significance of this study lies in transforming the abstract competency dimensions of the Sydney Accord paradigm into operational elements within the context of integrated cultivation, thereby resolving the difficulty of lacking quantitative bases for competency transfer between academic stages. The necessity of this study is reflected in the fact that current quality assurance for integrated cultivation mostly relies on empirical arrangements and lacks a systematic monitoring and dynamic adjustment mechanism based on competency mapping, making it difficult to achieve continuous optimization of cultivation plans. Based on this, this study explores the technical path for the localized application of the Sydney Accord paradigm to the integrated cultivation of secondary and higher vocational education from three levels: theoretical framework construction, evaluation indicator setting, and integration mechanism design.

1. Theoretical Framework of the Quality Assurance System for Talent Cultivation in the Integration of Secondary and Higher Vocational Education under the Sydney Accord Paradigm

1.1 Deconstruction and Transfer of the Core Competency Dimensions of the Sydney Accord Paradigm

The core competency dimensions defined by the Sydney Accord paradigm cover multiple aspects, including the application of technical knowledge, engineering problem analysis, the formation of design solutions, communication and collaboration, lifelong learning, and professional ethics. In view of the integrated cultivation context of secondary and higher vocational education in vocational colleges, this study deconstructs these dimensions hierarchically to distinguish the competency attainment goals for the secondary vocational stage and those for the higher vocational stage. The secondary vocational stage focuses on the formation of basic operational skills and normative execution abilities, while the higher vocational stage aims at the construction of complex task processing and system optimization abilities. The deconstruction process needs to map the original dimensions to the curriculum modules and practical training links of different academic stages based on the competency gradient theory, thereby ensuring the continuity and measurability of competency progression.

The migration of core competency dimensions from the secondary vocational stage to the higher vocational stage is not a simple replication but an adaptive reconstruction based on the academic stage characteristics of integrated cultivation. This migration mechanism is embodied in the segmented setting of competency goals and the precise matching of articulation points. The competency output of the secondary vocational stage serves as the competency input of the higher vocational stage, which needs to be quantitatively defined through the threshold standards in the competency mapping. During the migration process, certain higher-order dimensions in the original paradigm, such as complex system evaluation, need to be dimensionally reduced into operable sub-competencies for the secondary vocational stage, while their complete forms are retained for the higher vocational stage. This asymmetric migration strategy helps avoid competency gaps or repetitive training, thus forming a vertically integrated chain of skill development[1].

1.2 Quality Assurance Factor Identification Model for the Integration of Secondary and Higher Vocational Education

The quality assurance factor identification model is constructed based on the logical framework of system input, process, and output. Input-level factors include the knowledge foundation of enrolled students, the double-qualified teacher structure, the configuration standards of training equipment, and the curriculum articulation plan. Process-level factors cover the progressiveness of teaching content in instructional implementation, the consistency of assessment methods, and the degree of sharing of teaching resources between secondary and higher vocational education. Output-level factors focus on the degree of achievement of graduates' professional competencies, the job adaptation period, and the success rate of academic advancement. These factors are interrelated through causal chains, thus forming a static structural diagram of quality assurance for integrated cultivation.

The identification model uses multi-criteria decision analysis methods to rank the importance of the factors and to test their correlations. The assurance focus at the secondary vocational stage centers on the standardization of basic competency development, while the focus at the higher vocational stage shifts to the differentiated assurance of comprehensive application abilities. The model introduces the concept of threshold effects to identify key factors that exert nonlinear impacts on the integration quality, such as the overlap rate and the gap rate of course content. When the overlap rate exceeds a specific threshold, it will lead to a decline in learning motivation; an excessively high gap rate will result in a broken knowledge chain. The model accordingly provides the reasonable value ranges for each factor, thus offering quantitative bases for subsequent monitoring and intervention.

1.3 Outcome-Based Closed-Loop Mechanism for Quality Assurance in Integrated Cultivation

The outcome-based concept takes the goal of integrated cultivation of secondary and higher vocational education as a set of measurable and comparable learning outcomes. The closed-loop mechanism consists of four links: the goal-setting layer, the implementation monitoring layer, the evaluation feedback layer, and the improvement execution layer. The goal-setting layer formulates outcome indicators for each academic stage based on the competency standards in the Sydney Accord

paradigm. The implementation monitoring layer collects formative data during the teaching process, covering classroom performance, practical training operations, and periodic assessment results. The evaluation feedback layer performs a gap analysis between the collected data and the preset indicators, and then generates improvement suggestions. The improvement execution layer transforms these suggestions into specific actions such as curriculum adjustment, teaching method optimization, or resource reallocation.

The operation of the closed-loop mechanism follows the spiral progressive logic of continuous improvement. Each round of evaluation results serves as the correction basis for the next round of goal setting, thus forming a cyclic path from outcome definition to outcome verification and then to outcome enhancement. The mechanism design introduces a feedback delay control strategy to avoid data noise caused by excessively short evaluation cycles or improvement lags caused by excessively long cycles. The cross-stage feedback channel unique to integrated cultivation requires that the evaluation information from the secondary vocational stage can be transmitted to the higher vocational stage for adjusting subsequent teaching content and progress arrangements. At the same time, the graduate follow-up data from the higher vocational stage feedbacks influence on the cultivation plan of the secondary vocational stage, thereby achieving full-chain outcome-based closed-loop management[2].

2. Construction of Indicator Systems for the Quality Evaluation System for Talent Cultivation in the Integration of Secondary and Higher Vocational Education

2.1 Setting of Multi-Level Evaluation Standards for Learning Outcome Attainment

The multi-level evaluation standards for learning outcome attainment are set hierarchically based on the competency dimensions of the Sydney Accord paradigm. The first level consists of the basic skill attainment standards for the secondary vocational stage, covering the standardization of tool operation, the accuracy of process execution, and the ability to identify simple faults. The second level comprises the advanced skill attainment standards for the higher vocational stage, involving system debugging, parameter optimization, and cross-module coordination ability. The third level includes the overall outcome standards for integrated cultivation, focusing on the completion degree of complex work tasks, the quality of technical documentation writing, and the effectiveness of team collaboration. The standards at each level are connected through competency thresholds, with the minimum attainment value of the secondary vocational stage standards serving as the starting reference value for the higher vocational stage standards.

The quantification of the evaluation standards adopts the anchored reference method, which uses industry general vocational competency levels as the external benchmark. The evaluation standards at each level are subdivided into three grades: the pass line, the good line, and the excellent line, which respectively correspond to the three competency states in the Sydney Accord paradigm: basic mastery, proficient application, and innovative transfer. The measurement of attainment introduces the fuzzy comprehensive evaluation method to transform qualitatively described operational performance into quantitative scores. The evaluation at the secondary vocational stage focuses on the cumulative attainment of process indicators, while the evaluation at the higher vocational stage emphasizes the integrated attainment of outcome indicators. The innovation of setting multi-level standards lies in constructing a vertically comparable measurement scale, which enables the learning outcomes of different academic stages to be accumulated and compared on the same scale.

2.2 The Integration Path of Formative and Summative Evaluation under the Orientation of Continuous Improvement

The integration of formative evaluation and summative evaluation in the integrated cultivation of secondary and higher vocational education is based on the dual integration of the time dimension and the functional dimension. Formative evaluation runs through the entire process from the entrance of secondary vocational education to the graduation of higher vocational education, and it collects continuous data such as unit tests, training reports, periodic project reports, and classroom interaction records. Summative evaluation is set at the articulation points between academic stages and at the graduation nodes, including the secondary vocational completion assessment, the higher vocational entrance test, and the comprehensive graduation skills assessment. The core of the integration path lies in the fact that the formative evaluation results provide predictive bases for the summative evaluation,

and the summative evaluation results, in turn, modify the indicator weights and collection frequency of the formative evaluation.

The operationalization of the integration path uses a series design of the evaluation chain. Within each teaching unit, the formative evaluation accounts for 60% of the total evaluation weight, and the summative evaluation accounts for 40%. At the articulation point between academic stages, the cumulative average score of the formative evaluation serves as the access condition for the summative examination. The longitudinal tracking of evaluation data is achieved through individual student growth portfolios, which record the score fluctuations of each formative evaluation and the attainment status of the summative evaluation. The orientation of continuous improvement is embodied in the threshold mechanism that triggers teaching adjustments based on evaluation results: when the pass rate of the formative evaluation in the same class falls below the preset threshold for two consecutive times, the procedure of reorganizing teaching content or adding supplementary training links is automatically initiated. This integration path avoids the fragmentation of evaluation functions, so that improvement actions are no longer limited to end-of-semester summary feedback but are embedded in the micro-cycle of daily teaching operations[3].

2.3 Evaluation Information Feedback Network with Collaborative Participation of Stakeholders

The stakeholders cover five types of subjects: professional teachers, curriculum developers, teaching managers, students, and employer representatives. Professional teachers are responsible for providing real-time evaluation information at the classroom teaching level, including students' operational performance, homework completion quality, and classroom participation. Curriculum developers provide structural evaluation information on the attainment of curriculum goals, involving the appropriateness of module difficulty matching, the rationality of content articulation, and the discrimination of assessment questions. Teaching managers provide information on resource allocation and implementation compliance at the institutional level. Students generate feedback at the level of learning experience through self-evaluation and peer evaluation. Employer representatives provide evaluation information on job performance during the internship period and the early stage of employment.

The construction of the feedback network adopts a mechanism combining hierarchical diffusion and directional transmission. Horizontal feedback flows within the same level; for example, professional teachers share information on the overall performance of a class with each other to adjust the teaching pace. Vertical feedback transmits across academic stages: teachers from the secondary vocational stage transfer information on students' competency characteristics to the receiving teachers at the higher vocational stage, and the higher vocational stage reports graduates' job performance back to the curriculum development team at the secondary vocational stage. The standardized processing of feedback information adopts a unified coding rule to transform qualitative descriptions from different sources into aggregatable label data. The effectiveness of collaborative participation depends on the time compression strategy of the information feedback loop, which shortens the employer feedback cycle from annually to quarterly and increases the frequency of student self-evaluation from the end of the semester to after each project. The innovative value of this network lies in breaking the closed loop of evaluation information within a single subject and forming a three-dimensional feedback architecture that enables cross-validation and collaborative interpretation of multi-source information.

3. Integration Mechanism of the Sydney Accord Paradigm and the Quality Assurance and Evaluation System for Integrated Cultivation

3.1 Competency Mapping Method in the Vertical Articulation of the Curriculum System

The competency mapping method takes the competency dimensions of the Sydney Accord paradigm as the original nodes and uses the curriculum modules of both the secondary vocational stage and the higher vocational stage as the mapping carriers. The construction of the competency map first extracts competency labels from the course content of the secondary vocational stage, and each professional course is decomposed into several operable competency units. For example, a circuit analysis course corresponds to sub-competencies such as circuit identification, the use of measuring tools, and fault location. The courses at the higher vocational stage correspond to combinations of complex competency units; for instance, an automatic control system course corresponds to sub-competencies such as system modeling, parameter tuning, and stability analysis. The mapping

process establishes a two-way correlation matrix between course content and competency dimensions, and it quantifies the coverage intensity and occurrence frequency of each competency unit in the courses of different academic stages. This matrix also supports the calculation of competency redundancy and competency gaps, thereby providing a quantitative diagnostic basis for the articulation quality of the curriculum.

The vertical articulation of the competency map adopts the dual logic of hierarchical progression and horizontal expansion. Hierarchical progression means that the same competency dimension manifests as a basic operational form at the secondary vocational stage and evolves into a comprehensive analytical form at the higher vocational stage; for example, the competency of "wiring according to diagrams" at the secondary vocational stage progresses to the competency of "circuit topology optimization" at the higher vocational stage. Horizontal expansion refers to the continuous addition of related nodes to the competency dimension during the integrated cultivation process, resulting in an increase in the density of the competency network. The mapping method introduces the shortest path algorithm to identify the minimal curriculum sequence from the secondary vocational competency node to the higher vocational competency node, which is used to optimize the order of course offering. The visual presentation of the competency map adopts a force-directed layout, where node colors distinguish the academic stage affiliation, and line thickness indicates the strength of competency dependency. The value of this method lies in transforming the abstract competency framework of the Sydney Accord paradigm into an operable technical route for curriculum development, thereby avoiding repetition or omission in competency cultivation[4].

3.2 Design of Quality Monitoring Nodes in the Teaching Implementation Process

The quality monitoring nodes are distributed and designed according to the timeline of the integrated cultivation of secondary and higher vocational education and the law of competency progression. The monitoring nodes are divided into three types. The entry nodes are set at the two time points of entry into secondary vocational education and entry into higher vocational education, and they collect data on students' prior knowledge reserves and skill starting points. The process nodes are evenly distributed by semester, with three fixed monitoring points set in each semester, corresponding to the beginning, the middle, and the end of the semester. The exit nodes are set at the two time points of secondary vocational graduation and higher vocational graduation, and they collect terminal competency data of the complete cultivation cycle. The collection content of each monitoring node is matched according to the competency dimensions in the Sydney Accord paradigm: the entry nodes focus on basic knowledge and basic skills, the process nodes focus on periodic competency increments, and the exit nodes focus on comprehensive application and problem solving. The design of node density follows the law of non-uniform competency development, with monitoring frequency appropriately increased during the articulation period between academic stages.

The operational indicators of the monitoring nodes include two types: quantitative indicators and structured observation indicators. The quantitative indicators cover automatically collectable data such as the unit test score rate, the completion time of practical training tasks, and the accuracy rate of operational steps. The structured observation indicators include teachers' ratings of students' collaboration ability, problem representation ability, and innovative use of tools. The node design introduces a redundant monitoring mechanism, in which two backup indicators are set for each key competency dimension; when one indicator is missing due to the failure of a measurement tool, the backup indicator can provide substitute data. The monitoring frequency between nodes adopts decay memory weighting, in which recent monitoring data are assigned higher weights in the determination of competency status. The quality monitoring nodes form a nested relationship with the formative evaluation described in the previous chapter: the monitoring nodes provide the basic data source for the evaluation system, and the evaluation results, in turn, guide the indicator adjustment of subsequent monitoring nodes.

3.3 Dynamic Optimization Strategy of the Cultivation Plan Driven by Evaluation Results

The dynamic optimization strategy driven by evaluation results takes the quality assurance closed-loop mechanism constructed in Chapter 1 as its operational framework and uses the evaluation indicator system set in Chapter 2 as its input basis. The core logic of the optimization strategy is to directly map the difference analysis results of the evaluation output to the modifiable parameters of the cultivation plan. The modifiable parameters include course credit allocation, the prerequisite relationship between courses, the proportion of practical training hours in total class hours, the weight

configuration of assessment methods, and the setting of competency attainment thresholds. When the evaluation data show that the attainment of a certain competency dimension falls below the preset threshold, the system automatically identifies the set of courses corresponding to that dimension, calculates the contribution coefficient of each course to the attainment of that dimension, and then adjusts the course weight or reallocates the class hours accordingly. The determination of the contribution coefficients adopts the regression analysis method, which eliminates the collinearity interference among courses[5].

The dynamic optimization strategy adopts a trigger mode that combines rolling revision and point-based revision. Rolling revision takes the semester as the cycle, and it makes fine adjustments to the teaching plan for the next semester based on the cumulative data of formative evaluation, with the adjustment range limited to within 10% of the total class hours. Point-based revision is triggered at the articulation points between academic stages or at the graduation node, and it conducts a comprehensive review of the cultivation plan based on summative evaluation and graduate follow-up data, allowing an adjustment range exceeding 20%. The implementation of the strategy requires the establishment of a version control mechanism, which maintains a traceable relationship between the revision records of each version of the cultivation plan and the evaluation data that triggered that revision. The verification of the optimization effect is conducted by comparing the differences in the attainment of the same competency dimension between the two cohorts of students before and after the revision, and the significance test for the difference uses the independent samples t-test. The innovation of this strategy lies in shifting the revision of the cultivation plan from experience-driven to data-driven, thereby achieving a computable mapping relationship between evaluation results and plan adjustments.

Conclusion

This study has constructed a quality assurance and evaluation system for talent cultivation in the integration of secondary and higher vocational education based on the Sydney Accord paradigm, forming a three-level structure that includes a theoretical framework, evaluation indicators, and an integration mechanism. At the quality assurance level, this study clarifies the stage-based deconstruction method of competency dimensions, the factor identification model, and the closed-loop operation logic. At the evaluation system level, this study sets multi-level attainment standards, an evaluation integration path, and a multi-stakeholder feedback network. At the integration mechanism level, this study provides operational solutions for competency mapping, monitoring node layout, and dynamic plan optimization. The three parts form a logical progression from static structure to dynamic operation: the competency map provides the basis for the evaluation standards, the evaluation results provide input for the monitoring nodes and plan optimization, and the closed-loop mechanism ensures continuous linkage among all links. Future research directions can focus on the empirical calibration of the competency mapping algorithm to explore the differential laws of threshold setting under different professional categories; the conflict resolution mechanism of multi-source data in the evaluation information feedback network needs further modeling; and the calculation method of contribution coefficients in the dynamic optimization strategy can be adaptively adjusted by introducing machine learning techniques to improve the accuracy and response speed of cultivation plan revision.

Fund Projects

The 2025-2026 Vocational Education Teaching Reform Project of the Sichuan Provincial Vocational and Technical Education Society, entitled "Research on the Quality Assurance and Evaluation System for the Integrated Cultivation of Talents from Secondary to Higher Vocational Colleges in Vocational Institutions Based on the Sydney Accord Paradigm" (Project No.: Y251142).

The Chinese Association for Non-Government Education of the 2025 Planning Project of the China Association for Non-Government Education, with the project approval number: CANQN250805

References

[1] Xiao Dejun and Yang Shanjiang. "International Talent Cultivation in Higher Vocational Education: Realistic Dilemmas, System Construction, and Practical Exploration." Journal of Hubei Open Vocational College, vol. 37, no. 17, 2024, pp. 55-57, 60.
[2] Chen Dan and Li Zhenjiang. "Research on Talent Cultivation of Rural E-commerce Specialty under

the Sydney Accord Paradigm." Heilongjiang Grain, no. 11, 2023, pp. 100-103.
[3] Sun Jiexin, et al. "Exploration and Practice of Culturing Testing Talents in Reclamation Area Based on Sydney Accord." Farm Economic Management, no. 11, 2022, pp. 46-48.
[4] Cheng Wenhong and Liu Xiaomin. "Analysis of Talent Cultivation Objectives of Sino-Foreign Cooperative Education Based on Sydney Accord--Taking the Sino-Australian Cooperative Education Project of Architectural Engineering Technology as an Example." Journal of Huanggang Polytechnic, vol. 24, no. 3, 2022, pp. 15-18.
[5] Ji Zhenghui, Li Xiaowei, and Yang Jing. "Analysis on the Reference Significance of Sydney Accord to Talent Cultivation in Higher Vocational Education in China." In 2022 Proceedings of Chongqing Forum on Education and Teaching Management, edited by Shandong Maritime Vocational College, 2022, pp. 706-711.