Innovation in the Integrated “Job, Course, Competition, and Certificate” Academic Affairs Management Model in Technical Colleges

Xin Qiao*, Sisi Yang, Lingxiu Ban

Inner Mongolia Electromechanical Technician College, Baotou, 014000, China
**Corresponding author: bzpxzx20202@163.com*

Abstract: *Four elements (i.e., job, course, competition, certificate) within the talent cultivation system of technical colleges have close relations but they traditionally operate separate-line academic affairs management belonging to different functional modules that manage them independently which makes it hard for the traditional model to cope with the increasingly complicated interactions between the four. From analyzing the internal logic of the integration of the four elements, we analyzed multiple motivations for reforming the traditional management model by building an integrated academic affairs management model based on a four-dimensional framework including goal synergy, resource integration, process linkage, and evaluation connectivity. We designed an operational plan at the operational level such as a competency-progressive course–job alignment path, a flexible scheduling mechanism from the perspective of competition–training integration, and a three-stage evaluation chain oriented towards course–certificate integration. An operational support system built from three dimensions includes information platform, institutional system, and effectiveness evaluation. This model changes the organizational logic of academic affairs management from managing each segment separately into systematic coordination, offering an actionable path framework for improving the effectiveness of multi-element collaboration management for technical colleges.*

Keywords: *integrated academic affairs management; Job, Course, Competition, and Certificate; course–job alignment; competition–training integration; course–certificate integration.*

Introduction

Basically, technical colleges can cultivate frontline technical and skilled talents through job-oriented and competency-based talent cultivation process. The "job", "course", "competition" and "certificate" affects the cultivation process from aspects such as competency reference, construction path, dynamic verification and external confirmation that impact on the quality of cultivation. There are some issues currently exists: Course scheduling, competition training and certificate assessment is handled by different functional departments for information communication and resource coordination lack institutionization; Course content lags behind job update, Competition training encroaches upon regular teaching, Course assessment disconnected with certificate certification...Deeply rooted causes of the above problems lies in the misalignment of the structure between the systematic nature of the management model and the interactivity among the four elements. By analyzing the internal correlation mechanism among the four elements, we need to seek out an organization approach to academic affairs management matching them and build up an integrated management model characterized by systematic integration.

1. Theoretical Construction of the Integrated Academic Affairs Management Model

1.1 Internal Logic and Element Analysis of the Integration of Job, Course, Competition, and Certificate

The role of each element ("job", "course", "competition" and "certificate") in the talent cultivation system of technical colleges are different; they form an inter-related whole with their own internal logic chain (job demands is the target reference of competency cultivation, course teaching is the main path of competency construction, skills competition is a dynamic platform for verifying competency,

certificate certification implements the external confirmation of competency attainment) that do not simply link together but form a network of multiple interactions such that any change in one would affect the operating state of others through direct or indirect pathways[1].

The integration among them is based on three aspects: goal homology, content complementarity and evaluation synergy. The concept of goal homology means that the course objectives, competition standards and certificate requirements have been all targeted towards job competency as a benchmark; the Complementarity of content emerges when competition projects and certificate assessment content extension or deepening course teaching which has the support of basic course knowledge in competition training and certificate preparation; Synergy of evaluation means there is an institutional basis for mutual recognition and conversion of outcome between course assessment, competition results and certificate acquisition. This provides a theoretical premise for changing academic affairs management from "separate-line operation" into "integrated coordination."

1.2 Analysis of the Multidimensional Motivations for the Reform of the Academic Affairs Management Model

Traditional academic affairs management of technical college generally separates course management, competition management, and certificate management into different functions. It could still operate when there was less correlation among the four elements. As the connotation of technical education has been deeply developed, the deficiencies of this "separate-line operation" model have become apparent. The diversification of student composition will put pressure on flexible teaching arrangement; uniform pacing course scheduling and assessment method are not able to satisfy diversified cultivation need. Meanwhile, the iteration cycle of industry technology shortens to one to two years, while the approval process for changing course content under traditional academic affairs management still takes a semester or an academic year as its cycle: the time gap between them caused by it results in the continuous accumulation of disconnection between course content and job demand.

The institutional promotion of skills competitions and standardization of vocational qualification certification system reform has exacerbated the disadvantages of traditional management model on resources: concentrated demand of competition training for teachers, venues, and equipment conflict with the occupation of regular teaching; time rigidity of certificate assessment conflicts with established rhythm of course teaching... These multiple contradictions suggest that a structural mismatch between the organization logic of traditional "separate-line management" and the increasing interaction relationship among the four elements, and systematic reconstruction of the management model is an indispensable precondition for improving the effectiveness of talent cultivation.

1.3 Conceptual Definition and Framework Design of the Integrated Academic Affairs Management Model

Based on the above-mentioned logical analysis and motivation analysis, we defined "the integrated academic affairs management model" whose internal correlation among the four elements ("job," "course," "competition", and "certificate"), is its management object; it unifies planning, uniform scheduling, and unified evaluation of course scheduling, competition training, and certificate assessment under the scope of academic affairs management. The essence is changing from each working separately to the degree of alignment and synergy. Some distinctive features of our model relative to the traditional one reflects at the level of concept, organization, and technology: treat them as an organic whole rather than different parts (concept), creating a cross-functional overall coordination mechanism (organization) and depending upon an information system for connectivity and sharing of relevant data (technology)[2].

Designing Framework Based on Four-Dimensional Logic: Goal Synergy, Resource Integration, Process Linkage, and Evaluation Connectivity. Goal synergy means that course objectives, competition objectives, and certificate objectives are aligned with job competency as the benchmark; resource integration is about allocating resources (teachers, time, venues, and equipment), taking into account the threefold needs in total; process linkage is about integrating teaching progress, competition cycles, and assessment nodes in one integrated time schedule; evaluation connectivity is about creating a mutual recognition mechanism for course assessment, competition results, and certificate acquisition. The four-dimensional logic complies with the standard setting according to jobs, courses guided by standards, competitions promoted through courses, verified through competitions, and feedback through certificates form a management closed loop from job demands to course optimization.

2. Core Operating Mechanisms of the Integrated Academic Affairs Management Model

2.1 Design of a Competency-Progressive Course – Job Alignment Path

Essence of course – job alignment lies in converting the job competency standard into an operative sequence of course content. Job competency is not just a list of skills, it is a progressive hierarchy from basic operations to comprehensive applications so that there are three levels of competency map—"basic general competency—professional core competency—job-oriented competency" corresponding to different types of course—the basic level focuses on general industry knowledge and basic operational norms (public basic courses and professional group platform courses), the core level focuses on key technologies and typical processes in the professional field (professional core courses and comprehensive practical training courses) while the job-oriented level focuses on specialized skills and work processes for specific jobs (job elective courses and post internship segments). Three levels of competency form a vertical logic of "foundation—deepening—transfer", enabling students to make the role transition from novice to quasi-employee with step-by-step progression.

On this path, academic affairs management goes beyond just scheduling courses towards building a competency-oriented course matrix: academic affairs management should build up a dynamic mapping relationship between the job competency map and course modules; determine which competency is cultivated by each course unit and locate them within the whole competency system; establish trigger rules for updating course content. When there are any changes in job competency standards, academic affairs management department will initiate the revision process of course modules based on a preset response mechanism to make sure course content synchronizes with technological development. The alignment path depends on converting the original static course plan into an open system with self-adjusting capability allowing flexible replacement and update of local modules while not affecting the overall framework[3].

2.2 Teaching Scheduling and Resource Allocation from the Perspective of Competition – Training Integration

Overlapping resources (teachers, time, venues, equipment) between skills competition training and regular course teaching is obvious; separate management for two operations leads to resource crowding out and efficiency loss. Deconstruction of the essence of competition – training integration lies not only in overlapping competition training onto regular teaching, but also in deconstructing technical standards and training methods embodied by competitions, and integrate them into daily teaching links. Typical tasks in competition projects are comprehensive practical training projects in courses, the time period of competition training combined with concentrated practical training weeks in courses, and the specialized competence of competition coaches benefit more students through course teaching. Embedded relationship makes competition training change from "an additional teaching task" to "an extension and deepening of regular teaching".

The core functions of academic affairs management in competition – training integration include: Setting up a flexible resource scheduling mechanism including: Integrate competition cycles based on compilation of the semester teaching calendar with flexible teaching windows during concentrated competition time to satisfy intensive training need; Cross-department teacher deployment filing system so that teachers who take part in competition coaching can flexibly change their normal teaching tasks if they participate in training; Priority use rules for training venues and equipment which is dynamically allocated according to training urgency and teaching necessity. The academic affairs management should set up a regular channel to convert competition training results into daily teaching through integrating proven training methods, technical standards and evaluation tools from competitions into the course teaching resource repository without lose relevant experiences because of staff turnover after every competition ends.

2.3 Collaborative Assessment and Evaluation Mechanism Under the Orientation of Course – Certificate Integration

Inconsistent assessment standards, conflict in assessment nodes, and mutual non-recognition of assessment results are the disconnect between course assessment and certificate certification. The objectives of course – certificate integration management include the elimination of these three types of

disconnects. Implementation path: Building upon academic affairs management a three-stage progressive evaluation chain "process-based course assessment—simulated certificate assessment—final certification assessment". First stage: Organized and implemented by course instructors according to course teaching standards with focus on knowledge mastery and attainment of basic skills; Second stage: Coordinated by the academic affairs management department, conduct standardized simulated test referring to the type, difficulty, and time requirement of certificate assessment; Third stage: Take the formal certificate certification assessment. Functional progression of diagnosis—training—confirmation instead of three repetitive examinations[4] consists of three stages.

The three functions of academic affairs management department include: aligning assessment nodes; unifying standards; applying data. For alignment of assessment nodes, we should combine the scheduling of certificate assessment under the previous planning of the semester teaching calendar without disturbing the teaching order due to temporary notices. Unify standards through comparison of differences between the content of course teaching standards and certificate assessment syllabi to identify knowledge gaps and skill blind spots and feed it back to adjust courses. Applying data is to establish a mechanism for collection and analysis of assessment results, use assessment data at every stage to diagnose teaching quality and track the learning status of students. Set rules on recognition of outcomes between course assessment and certificate acquisition, clarify that some course assessment results may be replaced by corresponding modules in certificate examinations and convert certificate acquisition into credits for relevant courses, build an evaluation management system with two-way connectivity.

3. Operational Support and Effectiveness Optimization of the Integrated Management Model

3.1 Functional Architecture and Data Connectivity of the Academic Affairs Management Information Platform

In order to run this kind of integrated management model, we need to acquire in real time and flow information about all four elements: there are some new functional demands on the academic affairs management information system that cannot be met by the traditional course scheduling and grade management. Functional architecture design of information platform should focus on collecting, storing, correlating and analyzing the four kinds of data about "job, course, competition, and certificate" – Job competency database collects the skill standards for jobs corresponding to each major and their changing trajectory; Course resource database stores teaching element information (course syllabi, teaching progress, practical training projects), Competition question bank and Certificate examination question bank respectively collect competition training materials and certification assessment content. There is an associative mapping between four databases with a uniform coding system which allows any course module to query the corresponding job competency entry, relevant competition project and connectable certificate modules, and vice versa.

The key for data connectivity is breaking the data silo status of different functional modules within traditional information system, requiring the leadership of academic affairs management department define unified data interface standard and field definition rule to share course scheduling data, competition training data and certificate registration data at the underlying database level instead of just displayed on the interface level. Based on it, our platform could automatically detect conflicts (with competition cycles and assessment times) while compiling a teaching plan; real time display resource occupancy between training resource reservation and course scheduling; automatically calculate the attainment gap between grade entry and certificate assessment standards. With data connectivity, management decisions shift away from experience based upon data: All functional departments will have the same data view, decreasing coordination cost caused by information asymmetry[5].

3.2 Management System and Communication Mechanism for Multi-Subject Collaboration

Integrate the three business lines (course teaching, competition training, certificate certification) that were scattered together under one management system. Adjustments shall also be done on the management systems. Most of the traditional management systems are independently developed by each business line with no connection resulting in potential conflicts or blind spots when doing an integrated operation. Revision needed: Add linkage response provisions for competition cycle changes into the approval process for adjusting the teaching plan, Clarify the priority determination rules and adjustment processes if there is a conflict between competition training time and course teaching time;

Formulate recognition measures for mutually recognizing training outcome and course grade, Standardize the calculation standards and approval authority for converting competition result as course credit; Review rules for application of certificate exemption, Clarify what certificate module can substitute for what course module and limitation and conditions of substitution.

The effectiveness of information communication between multiple subjects depends heavily on the implementation of integrated management: There will be no attenuation/distortion in decision-making information through layer-by-layer transmission without institutionalized information transmission channel among academic affairs management department, professional departments, competition coaching teams and certificate training teachers. We establish a hierarchy communication mechanism where the management level achieve information symmetry via joint academic affairs meetings while the executive level achieve data aggregation/distribution via fixed information node at position of teaching secretary. The core communication system includes multi-party consultation for teaching plan at the beginning of the semester; Resource allocation coordination meeting before the start of competition cycle; Feedback notification about result after the end of certificate assessment. Nodes are embedded into routine process of academic affairs management so that every subject get the plans/resource demand from relevant parties at critical times and coordinate themselves within an institutional framework instead of adjudication by superiors each time.

3.3 Evaluation Indicator System and Continuous Improvement of Integrated Management Effectiveness

We need to check whether there is a synergistic effect through effectiveness evaluation with an integrated management model. We should focus on the degree of alignment and synergy for all four elements ("job, course, competition, and certificate"), rather than single operation indicators for each element. For instance: setting up observation indicators from three aspects such as the degree of alignment between courses and jobs (the coverage rate of job competency standards by course content and the ratio of the course update cycle to the job change cycle), the conversion rate from competitions to teaching (number of items in which competition standards are incorporated into course content; frequency and coverage of transferring competition training methods into regular teaching), and the degree of correlation between course assessment and certificate acquisition (calculating the correlation coefficient between course grades and certificate pass rates and the overlap ratio between course assessment content and certificate assessment syllabi)[6].

The effect evaluation does not decide superior or inferior but identifies deviated links under the guidance of an integrated management which drives improvement. Periodic collection of data by the academic affairs management department allows us to find out those course modules whose alignment is lower than the threshold, start content revision, identify specialties' direction with low conversion rate and trace bottlenecks for resource input and information transmission links, identify courses whose degree of correlation fluctuate and coordinate adjustment of assessment method and emphasis on content. We establish a management closed loop: "evaluation—feedback—adjustment—re-evaluation", thus making the integrated management model have the capability of continuously diagnosing and correcting its own operating state. The establishment of this kind of closed-loop mechanism changes our management model from a static institutional arrangement to a dynamic adaptive one where the operating effectiveness gradually converges towards the expected target range as the cycles go on.

Conclusion

Accordingly, according to the internal logic of "job, course, competition, and certificate", analyzing the shortcoming of the traditional "separate-line operation" model of academic affairs management, building the theory, core operating mechanism and support system of an integrated academic affairs management model taking element correlation as the management object, redefining the organization logic of academic affairs management with emphasis on goal synergy, resource integration, process linkage, and evaluation connectivity. Specially putting forward a competency-progressive course matrix design, a flexible resource scheduling scheme, and a three-stage progressive evaluation chain for the three key links of course–job alignment, competition–training integration, and course–certificate integration respectively, providing systematic operational support from three aspects (information platform, management system, and effectiveness evaluation) whose core value lies in shifting the focus of academic affairs management from the individual operations of elements to their interactions, using data and rules rather than experience and conventions when making management

decisions. In our future research there might be further deepening work in two directions: First, developing specific algorithms and models for data-driven decision-making in the information platform that can transform management suggestions from preset rules to intelligent recommendations; Second, Differentiate the integrated management model for different specialty types and different levels of schooling, explore the parametric adjustment space within the model framework so as to increase the model's applicability in different education settings.

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