Advances in Vocational and Technical Education (2025)
Clausius Scientific Press, Canada

DOI: 10.23977/avte.2025.070307
ISSN 2523-5834 Vol. 7 Num. 3

# *Integrating Competitions with Curriculum: Challenges and Strategies for Entrepreneurship Education in China's Vocational Colleges*

**Shudan Yang**

*College of Optoelectronics and Communication Engineering, Yunnan Open University (Yunnan Technical College of Industry), Kunming, 650500, China*
*y_shudan@163.com*

***Keywords:*** Competition-Teaching Integration; Entrepreneurship Education; Vocational Education and Training (VET); University-Industry Collaboration; Curriculum Development

***Abstract:*** To response to China's national agenda for reforming its modern vocational education system, this study addresses the persistent gap between entrepreneurship education and regional industrial demands. Through a sequential mixed-methods single-case study conducted in Yunnan Province (survey N = 297; semi-structured interviews), the research identifies key bottlenecks in the Competition–Teaching Integration (CTI) model within higher vocational colleges. Findings reveal three structural dilemmas: a misalignment between curriculum content and industry needs; an imbalance in faculty competencies (rule interpretation vs. industry experience); and a fragmented post-competition pipeline that impedes the conversion of student projects into viable ventures. While students report strong alignment with competition rules (72.7%), only 33.3% of projects map onto local pillar industries, and the venture conversion rate stands at a mere 6.3%. To address these challenges, we propose a Three-Tier Mapping Model that integrates curriculum reconstruction, faculty upskilling and incentivization, and platform synergy. This model aligns competition rubrics with course outcomes and provincial industrial strategies. By translating experiential learning theory into institution-level design within a non-Western VET context, the study contributes to international debates on effective entrepreneurship education and offers actionable insights for policymakers and vocational educators.

## 1. Introduction

The alignment of educational outcomes with industrial needs is a central challenge for vocational education worldwide[1,2], and it is especially critical in China, where national policy has prioritized a modern vocational education system to support industrial upgrading and regional development[3,4]. Recent policy guidance emphasizes city-level industry-education alliances and practice centers designed to narrow the distance between academic training and workplace demands[5]. While these initiatives create opportunities for pedagogical innovation, they also test the capacity of institutions

to implement reforms at speed and scale.[2].

The Competition-Teaching Integration (CTI) model is one such pedagogical innovation. It systematically embeds innovation and entrepreneurship competitions into the curriculum, thereby operationalizing experiential learning through authentic, time-sensitive projects involving multiple stakeholders[6]. This approach aligns well with Kolb's (1984) theory of experiential learning, which frames knowledge creation as a cycle of experience, reflection, abstraction, and experimentation[7]. International examples show that when competitions are part of a broader entrepreneurial ecosystem (such as MIT's tiered infrastructure and technology transfer programs), student projects are more likely to become viable business ventures[8]. In a similar vein, Israel's innovation system demonstrates how dense linkages between universities and industry can effectively catalyze entrepreneurial success[9].

From the perspective of the Triple Helix model, achieving robust entrepreneurial outcomes requires dynamic interaction among universities, industry, and government[10]. In many Chinese vocational education settings, however, competitions often seem to act as a substitute for, rather than a complement to, these vital connections. This can result in strong alignment with competition rules but weak alignment with market needs[11]. There remains a scarcity of empirically grounded research that quantifies the development of student capabilities and tracks the conversion of their projects into actual businesses, particularly within China's western provinces[12]. This study addresses that gap by investigating three core questions. First, how is the CTI model implemented in practice? Second, what are the key frictions that constrain its effectiveness? And third, what institutional designs could help resolve the disconnect between the curriculum, industry demands, and project incubation?

## 2. Methodology

We employed a sequential explanatory mixed-methods design for this research[13]. The study was conducted at "X College," a public vocational institution in Yunnan Province that is actively implementing CTI policies and participating in municipal-level industry-education alliances[14,15].

Survey and Sample. A structured questionnaire was designed, containing 27 items distributed across five key sections: background information, CTI implementation, industry adaptation and provincial needs, capability growth and outcome transformation, and open-ended suggestions. We collected a total of 297 valid responses. The sample was diverse, including current students who had not participated in competitions (59.26%), students who had (19.75%), and alumni with competition experience (20.99%). The disciplinary distribution was heavily weighted toward STEM fields (78.79%), which reflects the engineering-focused landscape of local vocational education. A reliability analysis confirmed that the scales used had acceptable to excellent internal consistency, with Cronbach's alpha values of 0.93 for Curriculum Alignment, 0.70 for Faculty Competence, and 0.83 for Educational Outcomes.

Interviews and Analysis. We conducted five semi-structured interviews with a graduate founder, a competition awardee, a senior mentor, and other staff. Interviews were transcribed and coded using NVivo 12. Thematic analysis proceeded from open to axial to selective coding to identify patterns connecting CTI enactment with outcomes. Key constructs were operationalized: "Curriculum Alignment" measured the fit between course content, competition tasks, and provincial policies; "Faculty Competence" assessed rule interpretation, industry experience, and resource-bridging capacity; and "Educational Outcomes" combined self-reported gains, proactive upskilling, teacher ratings, and venture conversion. Our analysis triangulated quantitative data (descriptive statistics, chi-square, t-tests) with qualitative themes.

Ethics and Data Integrity. Participation was voluntary with informed consent. All identifying information was removed during analysis. As some survey items were role-specific, denominators

vary by question; we therefore focus on interpreting within-item significance..

Limitations of Design. Because this is a single-case study and participants were not randomly assigned to competition groups, any causal claims are made with caution. Nevertheless, the institutional setting is representative of vocational colleges in China's western region, which supports the analytical generalizability of our findings.

## 3. Findings

### 3.1 Curriculum: Aligned with Rules, Disconnected from Markets

Our findings show that students feel their coursework effectively prepares them for the administrative aspects of competitions, with a 72.7% approval rate for understanding the rules. However, they also report weak support for essential market-facing tasks like financial modeling and market analysis. Many students perceived the curriculum's case studies as outdated and disconnected from provincial priorities. This is evidenced by the fact that only 32.3% of student projects targeted key local industries such as renewable energy, smart tourism, or biomedicine. Interviews with faculty illuminated this issue, describing curriculum revision cycles that are "measured in years" while sectoral changes happen "in quarters." One mentor vividly termed this disconnect as a situation where educational materials have "administrative half-lives longer than product cycles".

The data in Table 1 further illustrates this point. The low average scores for the first three items, which hover between 2.8 and 3.2, combined with low high-agreement rates of under 40%, signal a weak alignment between the curriculum, industry-relevant tasks, and policy goals. In sharp contrast, the fourth item reveals a strong student demand for more hands-on practice, with a mean score of 4.3 and an 82.4% high-agreement rate. This quantitative result confirms the gap identified in our interviews, where the slow pace of curriculum updates fails to keep up with the rapid evolution of the industry.

Table 1 Analysis of Core Items on Curriculum Alignment (N=279)

| Item | Sample Mean | High Agreement Rate (≥4 points) | Main Problems Identified |
|---|---|---|---|
| Professional course uses competition examples | 3.2 | 35.7% | Outdated cases (45.3%), lagging technology (38.6%) |
| Innovation & Entrepreneurship curriculum supports competition proposals | 2.8 | 28.5% | Lack of financial models (62.1%)<br>lack of market analysis tools (57.4%) |
| Integration into provincial industrial policy | 3.1 | 31.2% | Does not cover Green Energy 14th Five-Year Plan (70.3%) |
| Need to increase practical links (reverse) | 4.3 | 82.4% | Corporate diagnostics (76.5%)<br>business model canvas (68.2%) |

This "rule-driven" focus creates a pedagogical paradox where students become adept at following the rules of the academic game but are not equipped to innovate within the real economy. Furthermore, we identified a significant policy-curriculum lag. Although teachers were perceived to cite local industrial policies (Mean = 4.3), qualitative data revealed this integration is often superficial. Policy documents are typically mentioned as a contextual backdrop rather than being deconstructed into actionable project guidelines. This gap between abstract policy citation and concrete pedagogical application prevents competitions from becoming effective vehicles for regional development.

### 3.2 Faculty: Strong in Theory, Lacking in Practice

Mentors were widely praised for their skill in interpreting competition rubrics (90.9% approval). Yet, a striking 70.3% of faculty reported no direct industry work experience, and 65.2% had not participated in enterprise-based training within the last two years. This imbalance encourages a focus on adhering to competition formats over engaging in the boundary-spanning behaviors needed to secure real-world data, customers, or technical validation. The survey data reinforces this, showing that only 28.4% of projects received any substantive input from enterprises, suggesting a pattern of collaboration that is more episodic than deeply embedded. As prior research shows, formalized roles are essential for tangible innovation, whereas informal connections rarely lead to scalable outcomes[16,17].

This finding suggests that China's national "Dual-Teacher" policy, which encourages both academic and industry proficiency, is only partially realized at X College. Faculty appear "dual-qualified" in theory but often remain "single-skilled" in practice. The high frequency of "occasional" enterprise involvement (66.67%) implies that industry interactions are often ceremonial, such as giving a guest lecture, rather than engaging in deep, co-creative project development [18]. The root of this imbalance appears to lie in the institutional incentive structure. Professional advancement is tightly coupled with winning prestigious competition awards, while activities that build long-term industry capital, such as sustained enterprise practice, are poorly reflected in performance evaluations (Jessani et al., 2018; Wu, 2010). Without a systematic way to value these boundary-spanning activities, faculty rationally prioritize competition success over market validation.

### 3.3 Outcomes: High Capability Gains, Low Venture Creation

The data clearly shows that competition participants significantly outperform their non-participating peers ($p < .001$) in innovative thinking, market insight, and proactive skill acquisition. Despite these impressive gains, only 6.3% of projects convert into operational ventures. Interviewees attributed this sharp drop-off to a "thin" post-competition pipeline, citing limited access to seed funding, a scarcity of mentors with commercialization experience, ambiguous IP arrangements, and a reward system that celebrates medals over market validation. This environment contrasts with mature entrepreneurial ecosystems where competitions are entry points into structured venture funnels [19-21]. As shown in Table 2, while the cognitive and behavioral effects are large, the venture conversion rate is dramatically lower than the 38% benchmark at institutions like MIT [22]. This is consistent with global findings that entrepreneurial intentions do not automatically lead to sustainable ventures without sufficient resources and networks (Shane, 2004).

Table 2 Comparative Analysis of Education Outcomes Across Multiple Dimensions

| Evaluation Dimension | Participating Group (N=99) | Non-Participating Group (N=144) | Significance Test |
|---|---|---|---|
| Innovative Thinking | 86.7% | 42.3% | $\chi^2 = 45.32$*** |
| Market Insight | 78.5% | 35.1% | $\chi^2 = 38.17$*** |
| Behavioral Change (Active Learning New Skills) | 79.1% | 32.4% | $\chi^2 = 49.25$*** |
| Third-Party Evaluation (Average Teacher Score) | 4.2 | 3.1 | $t = 8.73$*** |
| Achievement Transformation (Conversion Rate) | 6.3% | — | Lower than MIT (38%) by 31.7% |

***$p < 0.001$.

CTI is an effective tool for human capital development. A striking 81.82% of participants actively learned new skills after the competition, demonstrating a tangible "active learning" effect. This suggests the problem is not a lack of student motivation but a systemic failure to channel these enhanced abilities. The journey from winning a competition to launching a business is fraught with a "valley of death" [23,24]. Our findings identify specific chokepoints: a resource chasm where institutional support is insufficient or arrives too late [25]; ambiguous IP ownership that deters investment; and a mentorship gap where students lose guidance after the competition ends [26]. This fragmentation directly contributes to the dramatic drop from high innovative thinking (86.7%) to low venture creation (6.3%).

### 3.4 Untapped Potential: Industry Demand and Alliances

One of the most promising findings is the strong student interest in competitions linked to regional industries. A remarkable 66.67% expressed a "strong willingness" to participate in thematic competitions focused on areas like "Smart Tourism." This reveals a clear strategic opportunity for administrators to co-design competition themes with local industry chambers, harnessing student motivation to address regional economic priorities. However, the role of government and industry-education alliances appears underdeveloped. While 51.52% were aware of government subsidies, a significant 39.39% were "unclear" about such support, indicating a communication gap. Consequently, the potential of these alliances to create a seamless pipeline from classroom to market is not being fully realized.

### 3.5 Robustness Checks and Limitations

Several considerations should be noted when interpreting these findings. First, the issue of self-selection may confound the observed effects, as more motivated students might be more likely to participate in competitions. Therefore, while we compare groups and find large differences, our causal claims remain tentative. Second, because some survey items were directed at specific subsamples (e.g., N=33 for competition-experienced respondents), direct comparisons across all items can be complicated. We have thus focused our interpretation on within-item significance. Third, as a single-case study, the external validity of our findings is limited. However, the institutional setting is typical of vocational colleges implementing CTI in China's western regions, which enhances the analytical generalizability of our conclusions.

## 4. Discussion

### 4.1 Reconciling Competing Logics

Our findings indicate that the CTI model is effective as pedagogy but underpowered as strategy. In experiential learning terms, students successfully complete the "concrete experience" and "reflective observation" phases, but the institution underinvests in the "abstract conceptualization" and "active experimentation" needed for market iteration (Kolb, 1984). This paradox is best understood through the lens of institutional logics (Thornton, Ocasio & Lounsbury, 2012), which reveals three conflicting value systems: the academic logic (awards, progression), the industry logic (profit, market validation), and the government logic (policy alignment). Without a mediating structure, the CTI model produces fragmented outcomes, achieving strong rule alignment but weak market alignment.

## 4.2 A Three-Tier Mapping Model for Systemic Reform

To address these structural disconnects, we propose a Three-Tier Mapping Model as a comprehensive design response. This model aims to create synergy across the curriculum, faculty development, and the institutional platform, directly tackling the core issues identified in our findings.

First, at the curriculum tier, the goal is to map competition evaluation criteria directly to course-level learning outcomes. This involves co-developing specialized sectoral modules with local enterprises to ensure that the curriculum remains relevant and practical.

Second, at the faculty tier, the focus shifts to reshaping professional incentives through the implementation of a formal "credit bank" for professional development. As detailed in Table 3, this system formally recognizes and rewards boundary-spanning activities like enterprise externships, collaborative project-firm matches, and successful technology transfer. By tying promotion points to these activities, the institution can reframe the role of faculty, encouraging them to become true boundary spanners rather than just rule interpreters. This directly addresses the competency imbalance and incentive disconnect identified in our findings.

Table 3 Example of "Dual-Teacher" Development Credit Bank Scoring Rules

| Activity Type | Standard Credits | Certification Requirements |
|---|---|---|
| Enterprise practice (≥1 month) | 20 credits/month | Enterprise assessment proof |
| Guiding competition winning provincial award | Gold: 30 credits<br>Silver: 20 credits | Award certificate |
| Participation in industry-education consortium | 10 credits/project | Project report |
| Transformation of technological achievements | 50 credits/item | Transformation contract |

Third, at the platform tier, colleges should institutionalize a structured Post-Competition Venture Funnel to address the alarmingly low 6.3% venture conversion rate. This mechanism would begin with a screening committee, composed of faculty, industry representatives, and alumni, which would triage all award-winning projects into one of three pathways: a high-potential "Venture Track", an "IP/Technology Transfer Track", or a "Skill Portfolio Track". Projects selected for the Venture Track would then receive a suite of dedicated supports. This would include access to a micro-grant seed fund (e.g., ¥5,000–¥20,000) to cover initial costs for prototyping and market testing. Simultaneously, these teams would be paired with mentors from a pre-vetted pool of local entrepreneurs for a fixed period, such as six months, to guide their transition from an idea to an early-stage startup. To underpin the entire funnel and remove a major barrier to commercialization, the college would also implement a standardized and transparent IP agreement template, clarifying the rights of all parties from the outset.

## 4.3 Implications for Policy and Regional Strategy

The feasibility and potential impact of this model are underscored by the strong student interest in industry-aligned projects. Our survey showed that a remarkable 66.7% of students are "strongly willing" to participate in competitions focused on regional priorities. This latent demand provides a powerful lever for change, suggesting that a shift toward industry-embedded competitions would be met with enthusiasm.

This presents a clear opportunity for government agencies as well. Provincial bodies can co-sponsor thematic competition tracks in partnership with colleges and local chambers of commerce. This would not only align the competition pipeline with regional economic priorities but also significantly increase the chances that student projects find their first customers and validation opportunities locally. For vocational colleges, implementing the Three-Tier Model represents a

strategic shift from simply running competitions to actively building an entrepreneurial ecosystem. It requires a long-term commitment to integrating curriculum design, faculty incentives, and incubation support into a cohesive and mutually reinforcing system.

## 5. Conclusion

This empirical study provided an in-depth investigation into the implementation challenges of the Competition-Teaching Integration (CTI) model within a Chinese vocational college. Our analysis identified three core structural dilemmas: a persistent misalignment between the curriculum and industry needs, a critical imbalance in faculty competencies, and a disconnected ecosystem for project incubation. We conclude that for the CTI model to fulfill its potential, it must transcend its role as a mere pedagogical tactic and become embedded within a systemic framework of institutional reform. The Three-Tier Mapping Model proposed in this paper, which integrates curriculum reconstruction, faculty upskilling, and platform synergy, offers a practical roadmap for achieving this transformation.

This transformation requires coordinated action at multiple levels. At the macro level, national and provincial governments can play a crucial role by incentivizing colleges to form genuine triadic alliances with industry and government, thereby realizing the innovative potential of the Triple Helix model. At the micro level, vocational colleges themselves must take concrete steps to build the necessary support infrastructure. This includes establishing internal incubation funds, implementing standardized IP management protocols, and cultivating robust mentorship pools that include experienced practitioners from key pillar industries. Such reforms are essential for addressing the "last mile" of venture creation and ensuring that competitions function not only as teaching tools but also as genuine engines of local economic growth.

The primary contribution of this research lies in its empirically grounded analysis of the CTI model within a non-Western vocational context, offering an actionable framework for both practitioners and policymakers. While the findings from a single-case study naturally have limitations in generalizability, they provide a rich, detailed portrait of the complex challenges at play. This work therefore lays the groundwork for future research, which should employ multi-case or large-scale quantitative designs to test the proposed model across different regions and institutional settings. Such comparative insights are needed to bridge the gap between context-specific reforms and the universal principles of effective entrepreneurship education.

Ultimately, the goal for vocational colleges should be to reframe the purpose of every competition. It must evolve from being a symbolic performance into a vibrant nexus where students, enterprises, and policymakers can jointly construct the pathways for regional innovation. Only by achieving this can the Competition-Teaching Integration model truly fulfill its dual mission: to cultivate the next generation of entrepreneurial talent while simultaneously supporting substantive regional industrial upgrading.

## Conflicts of Interest

There are no conflicts to declare.

## Acknowledgements

This research was financially supported by the 2024 Yunnan Provincial Department of Education Scientific Research Fund Project "Research on Innovation and Entrepreneurship Education in Higher Vocational Colleges under the Integration of Competition and Teaching" (Grant No. 2024J1979).

## References


*[1] Liu H, Paramalingam M. Aligning Vocational Education with Emerging Industry Trend[J]. Journal of Neonatal Surgery, 2025.*

*[2] Mahmudah F N, Santosa B. Vocational School Alignment Based-on Industry Needs[J]. Journal of Vocational Education Studies, 2021.*

*[3] Zhang X W, Ayob A. A Study on the Contribution of Vocational Education and Training to the Industrial Development in China[J]. Journal of Contemporary Educational Research, 2024.*

*[4] Hu S. Research on the Professional Setting and Adjustment of Vocational Education Based on Industry Development Trends[J]. Frontiers in Educational Research, 2024.*

*[5] Huang R. Optimizing the Training Model for Field Engineers to Meet Industrial Development Needs: A Case Study of Vocational Education[J]. International Journal of Education and Humanities, 2025.*

*[6] Xing Y, He L, Liu Y, et al. Research on the Integration Mode of Teaching and Competition Based on 3D Digital Innovation Design Competition[J]. Education Reform and Development, 2025.*

*[7] Kim D, Ding L, Cho T. Bridging theory and practice: the effects of experiential learning-based simulation training on technology integration competency among pre-service teachers[J]. Journal of Research on Technology in Education, 2025.*

*[8] Roberts E, Murray F, Kim J. Entrepreneurship and Innovation at MIT: Continuing Global Growth and Impact—An Updated Report[J]. Foundations and Trends® in Entrepreneurship, 2019.*

*[9] Sánchez A R, Charry G P, Burbano-Vallejo E L. Exploring the entrepreneurial landscape of university-industry collaboration on public university spin-off creation: A systematic literature review[J]. Heliyon, 2024, 10.*

*[10] Cheng C, Cheng S, Feng C. The Triple Helix Model for Industry-Education City Integration in China: A Development Approach[J]. SAGE Open, 2024, 14.*

*[11] Shao L, Miao Y, Ren S, et al. Designing a framework for entrepreneurship education in Chinese higher education: a theoretical exploration and empirical case study[J]. Humanities and Social Sciences Communications, 2024, 11: 1-12.*

*[12] Li M, He L, Zhao Y. The triple helix system and regional entrepreneurship in China[J]. Entrepreneurship & Regional Development, 2019, 32: 508-530.*

*[13] James T, Dejonckheere M, Guetterman T. Integrating Transformative Considerations and Quantitative Results Through a Participant Selection Joint Display in Explanatory Sequential Mixed Methods Studies[J]. Journal of Mixed Methods Research, 2022, 18: 14-30.*

*[14] Hardy I, Liu S. Complex connectivities: Policy networks, data infrastructures and vocational education reform in China[J]. International Journal of Educational Research, 2022.*

*[15] Zhuang T, Zhou H. Developing a synergistic approach to engineering education: China's national policies on university–industry educational collaboration[J]. Asia Pacific Education Review, 2022, 24: 145-165.*

*[16] Pollok P, Lüttgens D, Piller F. How Firms Develop Capabilities for Crowdsourcing to Increase Open Innovation Performance: The Interplay between Organizational Roles and Knowledge Processes[J]. Journal of Product Innovation Management, 2019.*

*[17] Wang H, Zhao Y, Dang B, et al. Network centrality and innovation performance: the role of formal and informal institutions in emerging economies[J]. Journal of Business & Industrial Marketing, 2019.*

*[18] Ai L, Zhao Y. Study on Developing "Dual-Teacher and Dual-Capacity" Faculty of Vocational Colleges in China[J]. Advances in Vocational and Technical Education, 2024.*

*[19] Konak A, Kulturel-Konak S, Schneider D, et al. Enhancing student learning in innovation competitions and programs[J]. European Journal of Engineering Education, 2024, 50: 360-380.*

*[20] Watson K, Mcgowan P, Smith P. Leveraging Effectual Means through Business Plan Competition Participation[J]. Industry and Higher Education, 2015, 29: 481-492.*

*[21] Lackéus M. Comparing the impact of three different experiential approaches to entrepreneurship in education[J]. International Journal of Entrepreneurial Behaviour & Research, 2020, 26: 937-971.*

*[22] Zhao Y, Zhao X, Shi J, et al. Impact of entrepreneurship education in colleges and universities on entrepreneurial entry and performance[J]. Economic Research-Ekonomska Istraživanja, 2022, 35: 6165-6184.*

*[23] Treanor L, Noke H, Marlow S, et al. Developing entrepreneurial competences in biotechnology early career researchers to support long-term entrepreneurial career outcomes[J]. Technological Forecasting and Social Change, 2020.*

*[24] Harima A, Gießelmann J, Göttsch V, et al. Entrepreneurship? Let us do it later: procrastination in the intention–behavior gap of student entrepreneurship[J]. International Journal of Entrepreneurial Behaviour & Research, 2021.*

*[25] Caliat C. Entrepreneurial Obstacles and Challenges of Student Entrepreneurs[J]. International Journal For Multidisciplinary Research, 2024.*

*[26] Haneberg D, Aaboen L. Incubation of technology-based student ventures: The importance of networking and team recruitment[J]. Technology in Society, 2020, 63: 101402.*