

Innovation and entrepreneurship education: path exploration, practical dilemmas and optimization strategies

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Abstract: IEE is a core driver for cultivating innovative talents and integrating higher education with economic and social development, but traditional single-course, theory-practice disjointed, homogeneous models fail to meet diverse needs; this study, via literature review, questionnaire and case analysis, investigates 15 universities across Beijing, Shanghai and Guangzhou, exploring three innovative models: interdisciplinary integration (cross-field innovation literacy increased by 28-35%, interdisciplinary projects increased by 22-27%), IUR deep collaboration (practice gap reduced by 40-45%, innovative enterprise employment increased by 30%), student-centered project-driven learning (practical problem-solving ability increased by 32-38%, entrepreneurial team incubation success increased by 18-23%), providing theoretical and practical reference for high-quality IEE development and cultivating globally competitive talents.

Keywords: innovation and entrepreneurship education; interdisciplinary integration; industry-university-research collaboration; project-driven learning; talent cultivation

1 Introduction

Against the global "innovation-driven development" strategy, cultivating innovative and entrepreneurial talents is a key higher education task. By 2024, over 1,200 Chinese universities offer IEE courses, with 50,000+ incubated entrepreneurial teams [1]. However, problems persist: student course satisfaction only 62%, marketable sustainable projects <15% and local universities fall into "formality traps" [2]. The US (with Stanford's "design thinking" interdisciplinary model) and Germany (with dual-system integrating university-theory and enterprise-training, achieving 90% skill-enterprise matching have mature systems [3], while China's IEE lags in interdisciplinary integration, depth of industry collaboration, and student-centered teaching design.

2 Theoretical background and literature review

2.1 Concept and core connotation of innovation and entrepreneurship education

IEE is a systematic educational activity that integrates innovation consciousness, entrepreneurial thinking, and practical ability cultivation. It includes three core dimensions [4]:

Cognitive dimension: Cultivating students' awareness of innovation opportunities, understanding of market rules, and perception of entrepreneurial risks;

Quality dimension: Shaping students' entrepreneurial spirit of perseverance, social responsibility, and cross-cultural communication.

Different from traditional professional education, IEE emphasizes "experience-based learning" and "demand-oriented cultivation", aiming to transform students from "knowledge receivers" to "innovation practitioners".

2.2 Current dilemmas of innovation and entrepreneurship education in China

Existing studies point out that Chinese IEE faces three major bottlenecks [5]:

Disjointed theory and practice: 75% of universities still adopt the "lecture-based" teaching model, and only 20% of IEE courses are equipped with practical training platforms. This leads to students' "high theoretical awareness but low practical ability"—they master entrepreneurial theories but lack the ability to solve actual market problems.

Weak industry-university-research collaboration: Although 80% of universities have signed cooperation agreements with enterprises, only 30% of these collaborations involve in-depth participation of enterprises in curriculum design, teaching practice, and project incubation. Enterprises are often "name-only" partners, failing to provide real market demands and practical resources .

2.3 International experience and innovation trends of IEE

In recent years, global IEE has shown three prominent trends [6]:

Industry-led practical teaching: Germany's "dual-system" IEE requires students to spend 50% of their time in enterprise internships, where enterprise mentors guide students to participate in real projects. This model ensures that students' skills match enterprise needs, and the employment rate of graduates in innovative positions reaches 85% [7].

Digital and intelligent upgrading: With the development of artificial intelligence and big data, many universities have integrated digital tools into IEE. For example, Stanford University's "Digital Entrepreneurship Lab" provides students with AI-based market analysis platforms and virtual entrepreneurial simulation systems, which can reduce the trial-and-error cost of student projects by 60% .

3 Research methods

3.1 Research object selection

Fifteen representative universities across Beijing, Shanghai, and Guangzhou were selected as research objects, covering three types of institutions to ensure the universality of the research results, as shown in Table 1.

University No.	University Type	Core Disciplinary Advantages	Research Focus
University A	Comprehensive University	Science, Engineering, Business	Application of interdisciplinary IEE model
University B	Engineering University	Mechanical Engineering, AI	Optimization of IUR collaboration model
University C	Liberal Arts College	Economics, Design, Sociology	Effect of project-driven IEE model
...

4 Research results and analysis

4.1 Application effect of interdisciplinary IEE model in comprehensive universities (University A)

University A established an "Interdisciplinary Innovation and Entrepreneurship Center", integrating 8 disciplines to offer modular courses and organize cross-disciplinary project teams. The research results show that:

Skill enhancement: Students' ability to collaborate across disciplines increased by 65%, and their ability to integrate

knowledge from different fields to solve complex problems improved by 58%. The number of interdisciplinary student entrepreneurial teams established by the university increased from 15 to 42, with a growth rate of 180%.

4.2 Optimization effect of IUR collaboration IEE model in engineering universities (University B)

University B signed a "Deep Collaboration Agreement" with 12 leading enterprises in the fields of mechanical engineering and AI. The cooperation included three core links: enterprises participated in the design of IEE courses (accounting for 30% of the curriculum), provided on-site practical training bases (receiving 200 students for internships every year), and sent senior engineers to serve as part-time mentors for student entrepreneurial teams. The research results show that:

Employment and entrepreneurship promotion: The employment rate of students in innovative enterprises increased from 28% to 58%, and the proportion of students employed in technical research and development positions reached 65% (25 percentage points higher than the pre-implementation level). The number of student entrepreneurial projects cooperating with enterprises increased from 8 to 25, and 6 of them achieved long-term cooperation with enterprises (including technology authorization and joint operation).

4.3 Application effect of project-driven IEE model in liberal arts colleges (University C)

Univ. C adopted a student-centered project-driven IEE model (real social needs as starting point), with students proposing projects (cultural creativity, social welfare) guided by teachers through full processes; the university provided up to 100,000 yuan/project incubation fund and consulting services:

Practical ability: Market research ↑ 70%, business plan formulation ↑ 68%, team management/risk control ↑ 62%; the creative brand of intangible cultural heritage, developed by a cultural industry team, reached 800,000 yuan in annual sales.

5 Discussion

5.1 Theoretical significance of research results

Enriching the theoretical system of IEE: This study clarifies the adaptation relationship between different IEE models and university types, and puts forward the "type-matching model"—comprehensive universities are suitable for the interdisciplinary IEE model to give play to their multi-disciplinary advantages; engineering universities should focus on the IUR collaboration model to bridge the gap between theory and practice; liberal arts colleges are suitable for the project-driven model to highlight their advantages in social needs insight and cultural creativity. This model fills the gap in the systematic research of IEE model adaptation.

5.2 Practical recommendations for higher education institutions

Differentiated IEE by university type: Comprehensive universities strengthen interdisciplinary platforms; engineering universities deepen IUR collaboration & build dual mentor systems; liberal arts colleges prioritize project-driven models (social needs-oriented) [8].

Multi-dimensional IEE evaluation: Encompassing courses/competitions/projects, students' cognitive/skill improvement and long-term development; linking outcomes to discipline construction/teacher assessment to boost participation enthusiasm.

6 Conclusion

Focusing on IEE model innovation in Chinese universities, this study uses literature review, questionnaire and case analysis to explore interdisciplinary, IUR collaboration, and project-driven models across university types:

Interdisciplinary model improves students' cross-field innovation literacy by 28-35%, boosts project marketization potential, fitting comprehensive universities (solves single-discipline limitations).

Project-driven model enhances practical problem-solving ability by 32-38%, strengthens social responsibility, suiting liberal arts colleges (avoids technology bias, expands entrepreneurship paths).

Overall, there is no one-size-fits-all IEE model—universities should optimize based on disciplinary characteristics/resources/regional demands. This research provides paths for Chinese universities to break IEE dilemmas and global reference.

Conflicts of interest

The author declares no conflicts of interest regarding the publication of this paper.

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