Research on the In-depth Integration of Innovation and Entrepreneurship Education and Professional Education in Universities under the Background of "Internet+"

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Abstract: Driven by the "Internet+" educational transformation, deeply integrating innovation and entrepreneurship education with professional education has become a strategic imperative for universities to cultivate interdisciplinary and competent innovative talent. However, current integration efforts remain largely perfunctory, characterized by disjointed curricula, rigid teaching models, insufficient digital affordances, and underdeveloped faculty capacity. Drawing on university teaching practices, this study identifies the critical barriers to deep integration and proposes actionable pathways across five key areas: curriculum restructuring, teaching model innovation, faculty development, practical platform construction, and evaluation mechanism refinement. These pathways leverage internet technologies, digital platforms, and blended online-offline teaching methods to achieve meaningful integration under the "Internet+" framework.

Keywords: Internet+; Higher Education; Innovation and Entrepreneurship Education; Professional Education; Deep Integration; Talent Development

1. Introduction

With the deepening of the "Internet+" action plan and the accelerated digital transformation of higher education, universities face increasingly urgent demands to cultivate innovative and interdisciplinary talent [1]. Deeply integrating innovation and entrepreneurship education with professional education has become a strategic lever for overcoming the constraints of traditional educational models and achieving holistic student development [2].

Professional education underpins university curricula, while innovation and entrepreneurship education provides the primary lever for enhancing graduate competitiveness. Their deep integration is not a mechanical sum of discrete components but rather a systemic alignment across four dimensions—concepts, content, pedagogy, and assessment—facilitated by digital technologies [3].

2. The Core Connotation and Internal Logic of the Integration between Professional Education and Innovation & Entrepreneurship Education in Universities under the Background of "Internet +"

Under the dual imperatives of higher education's digital transformation and the system-wide institutionalization of innovation and entrepreneurship (I&E) education, the deep integration of I&E education with professional education—hereafter referred to as I&E–Professional integration—is not a mere addition of content or a superficial restructuring of formats. Rather, it entails a conceptual reconstruction, systemic integration, and strategic alignment of pathways oriented toward talent development goals. "Internet+" technologies serve as a critical enabler in this process, removing barriers and enhancing both quality and efficiency [1].

From the perspective of its core connotation, professional education is the primary vehicle for talent cultivation in higher education, focusing on imparting theoretical knowledge, developing core professional skills, and fostering professional competence [4]. I&E education, by contrast, is not reducible to skills-based entrepreneurship training. Instead, it is a holistic educational approach centered on fostering students' innovative spirit, entrepreneurial awareness, and creative capacity, encompassing innovative thinking, practical skills, risk awareness, and teamwork competencies [2].

The two are not discrete educational components but rather mutually reinforcing elements of a symbiotic whole. Professional education provides the essential knowledge base for I&E education, while I&E education, in turn, revitalizes and provides direction for professional education, extending its focus from theoretical instruction to practical application. This synergy ultimately enables professional education to serve as a knowledge foundation and innovation as a catalytic force for graduate development [5].

In terms of its underlying logic, I&E–professional integration is fundamentally defined by three interrelated dimensions: shared objectives, integrated content, and practice-based synergy [6].

At the objective level, both forms of education are grounded in higher education's core mission of holistic character and competence development, aiming to cultivate competent, application-oriented, and interdisciplinary graduates [4]. At the content level, professional knowledge provides the essential foundation for innovation and entrepreneurship (I&E), whereas I&E thinking and methodologies unlock the practical value of professional knowledge, enabling bidirectional articulation between theory and practice [7]. At the practical level, professional practice contexts offer a concrete setting for I&E implementation; in turn, I&E practices drive improvement in professional teaching, creating a virtuous cycle of "teaching → practice → pedagogical feedback" [8].

Driven by iterative advances in internet technologies, I&E–professional integration in the digital age exhibits several novel characteristics. First, it breaks down physical and temporal barriers, enabling widespread access to high-quality resources via MOOCs, online training platforms, and digital teaching repositories [9]. Second, it drives pedagogical innovation by leveraging big data, virtual simulation, and online collaboration tools, shifting integrated teaching from one-way instruction to two-way interaction [10]. Third, it enhances industry-education alignment efficiency, with the internet serving as a bridge for real-time collaboration between universities and industries [11]. Fourth, it digitizes evaluation systems, using data-driven methods to assess students' professional competencies and I&E literacy throughout the learning process [12].

3. Current Dilemmas in the Integration of Innovation and Entrepreneurship Education and Professional Education in Universities

"Internet+" has indeed created new opportunities for the deep integration of specialized education and innovation and entrepreneurship education in higher education institutions. However, although most domestic universities have incorporated innovation and entrepreneurship education into their talent development systems, they still encounter numerous challenges when implementing it in practice. Factors such as traditional educational concepts, institutional mechanisms, and resource allocation have prevented these two forms of education from truly merging—often resulting in a superficial integration where each operates independently [13]. Based on research findings and feedback from universities, there are currently five distinct challenges hindering the integration of major-specific education and innovation and entrepreneurship education. For instance, there are cognitive biases, and top-level design has failed to keep pace [5]. Some universities lack a comprehensive understanding of what this integration entails and have not planned their joint development within the broader context of talent cultivation. Some institutions view innovation and entrepreneurship education merely as a matter of organizing a few lectures, hosting competitions, or running incubation activities, keeping it completely separate from academic courses [13]; others worry that such education will encroach on class time for major courses and hinder knowledge transmission, treating it as an add-on rather than core content. These cognitive biases have reduced integration to a reform of slogans, with efforts remaining at the level of issuing policy documents [13]. The curriculum system also lacks organic integration [9]. While courses serve as the core vehicle for integration, most universities have yet to establish an integrated curriculum system; major-specific courses and innovation and entrepreneurship courses remain separate, with little overlap in content [6]. On the one hand, major-specific courses remain theory-heavy, rarely incorporating examples of industry innovation, practical entrepreneurial skills, or internet-based innovative thinking [7]; on the other hand, innovation and entrepreneurship courses are mostly general-purpose liberal arts courses with broad, non-targeted content [2]. Furthermore, there are few high-quality online

course resources capable of integrating these two areas, preventing their true integration [9]. Teaching models have also failed to keep pace with changes driven by technological advancements [10]. The traditional classroom model, where teachers lecture and students listen, remains the norm; the situation of one-way knowledge transfer by teachers and passive reception by students has not changed. Most instructors have not fully leveraged technologies such as big data, virtual simulation, and online collaboration platforms to improve teaching methods; they have neither implemented blended learning nor fostered innovative thinking through project-based or case-based teaching [8]. Even when universities have purchased digital equipment, it is often used merely to display course materials, failing to simulate real-world industry innovation and entrepreneurship scenarios [10]. The faculty also lacks the ability to effectively integrate both disciplinary expertise and innovation and entrepreneurship competencies [14]. While teachers are a crucial pillar for deep integration, the current faculty structure is relatively homogeneous and exhibits significant gaps in capabilities. Most discipline-specific instructors focus on academic research and theoretical instruction, lacking practical corporate experience and hands-on skills in innovation and entrepreneurship [5]; many teachers dedicated to innovation and entrepreneurship education have transitioned from administrative roles and lack systematic disciplinary knowledge [2]. Furthermore, the training system for faculty capable of integrating these two areas is underdeveloped, and the development of such multidisciplinary competencies among instructors is slow [14]. Support from practical training platforms is also weak [11]. Practical instruction is a key component of integration, yet there are widespread issues such as limited platform diversity, insufficient resources, and low levels of digitalization. Most university innovation and entrepreneurship bases and specialized training centers are traditional on-site facilities with outdated equipment and limited functionality, lacking "Internet+ Innovation and Entrepreneurship" training platforms and virtual simulation systems [9]. Collaboration between universities and enterprises is not sufficiently deep; many off-campus practice bases are merely nominal partnerships, and corporate participation is not very enthusiastic [12]. At the same time, the practical evaluation system is also inadequate, focusing only on form rather than actual results, and failing to use digital methods to track the process and conduct quantitative assessments.

4. Implementation Paths for the In-depth Integration of Professional Education and Innovation & Entrepreneurship Education in Universities Driven by "Internet +"

To address the five core challenges currently facing I&E–professional integration in Chinese universities, this study proposes a comprehensive and practicable pathway for deep integration across five key dimensions—curriculum systems, teaching models, faculty development, practical platforms, and evaluation mechanisms—by harnessing the digital affordances of "Internet+".

First, curriculum restructuring should leverage online resource platforms to integrate specialized knowledge modules with I&E case studies. Digital repositories and open educational resources can facilitate the embedding of innovation and entrepreneurship content into disciplinary curricula.

Second, pedagogical innovation should deploy digital tools—including live interactive sessions and virtual simulations—to overcome the physical and temporal barriers of traditional classrooms, thereby enabling students to cultivate innovative thinking in simulated scenarios. Blended and flipped learning models can further enhance student engagement and active learning.

Third, faculty development should be strengthened through online professional development programs and inter-university collaborations. These initiatives can enhance faculty capacity for integrating disciplinary content with I&E guidance, addressing the current gap in interdisciplinary competencies among instructors.

Fourth, practical platforms should leverage internet technologies to establish cross-regional project-matching channels, exposing students to authentic market demands and real-world problem-solving contexts. University–industry partnerships can be deepened through digital platforms that facilitate sustained collaboration.

Fifth, evaluation mechanisms should introduce digital assessment tools to assess student performance across multiple dimensions, including professional competence, innovation

outcomes, and entrepreneurial readiness. Learning analytics and portfolio-based assessment can enable continuous, data-driven evaluation.

Collectively, this pathway design aligns with the immediate practical needs of Chinese universities while harnessing the unique role of "Internet+" in resource integration, scenario simulation, and ecosystem building.

4.1 Restructuring an Integrated Curriculum System to Solidify the Foundation of I&E–Professional Integration

The curriculum system serves as the core vehicle for I&E–professional integration. The key is to break down institutional barriers between specialized education and I&E education by embedding internet thinking, I&E concepts, and industry-specific innovation skills throughout the talent cultivation process [6].Universities should reconstruct a four-tier articulated curriculum framework:

Tier 1: Foundational specialized courses. These courses identify I&E touchpoints within each discipline's core curriculum, laying the groundwork for subsequent integration.

Tier 2: I&E core courses. Customized for different specializations, these courses highlight disciplinary characteristics and internet-oriented I&E directions [2].

Tier 3: Internet-based practical training courses. Leveraging MOOCs, micro-lectures, and national online premium courses, this tier offers specialized offerings such as big data analytics, virtual simulation training, and online entrepreneurship simulations [9].

Tier 4: Comprehensive practice courses. This tier integrates specialized training, I&E practice, and capstone projects into a unified design.

In parallel, universities should develop I&E–professional integration curriculum standards and produce accompanying digital course textbooks.

4.2 Innovating Digital Teaching Models to Enhance the Effectiveness of Integrated Education

Leveraging digital technologies such as the internet, big data, and virtual simulation, institutions should overcome the physical and temporal barriers of traditional classrooms and adopt a blended learning model that integrates online and offline instruction with theory and practice [10]. On the one hand, institutions should fully implement blended online-offline teaching, utilizing platforms such as Chaoxing Learning Pass, Wisdom Tree, and Rain Classroom to create a closed-loop learning cycle of pre-class online preparation, in-class interactive instruction, and post-class consolidation and enrichment. On the other hand, institutions should innovate project-based, case-based, and immersive teaching models by selecting authentic internet-plus-related I&E cases and practical projects, guiding students to conduct online collaborative discussions and offline hands-on execution. At the same time, virtual simulation practice platforms and online entrepreneurship simulation systems should be introduced, enabling students to develop their professional and I&E competencies through immersive experiences.

4.3 Building a Hybrid-Competency Faculty to Strengthen Support for Integrated Talent Development

To address the current issues of limited and narrowly focused faculty competencies and the disconnect between specialized and I&E education, institutions should leverage the internet to establish a faculty development and collaboration platform, thereby building a hybrid-competency faculty development system that integrates on-campus development with external recruitment and online training with offline practice [14].

On campus, institutions should establish a regular faculty training platform and engage specialized faculty in internet-based I&E training, corporate secondments, and interdisciplinary teaching and research exchanges. Off campus, institutions should break down barriers between universities and industries by recruiting senior corporate innovators, technical experts, and entrepreneurship mentors as adjunct faculty. Meanwhile, institutions should leverage online teaching and research platforms to facilitate real-time communication and collaboration between on-campus faculty and off-campus mentors. Furthermore, institutions should establish an evaluation and incentive mechanism for I&E–professional integration faculty, incorporating integrated teaching outcomes into professional title reviews and performance evaluations.

4.4 Building a Multifaceted Digital Practice

Platform to Solidify the Delivery Vehicle for Integrated Practice

Institutions should leverage internet technologies to build a multifaceted, integrated practice platform that combines on-campus and off-campus, online and offline elements, thereby bridging the "last mile" between specialized study and I&E practice [11]. On campus, institutions should establish a university-level digital I&E training platform, a virtual simulation practice center, and specialized I&E incubation bases, integrating online training resources with offline hands-on venues [9]. Off campus, institutions should deepen university-industry collaboration by leveraging the internet to establish online practice bases that connect universities and industries, overcoming geographical barriers and partnering with firms to launch authentic I&E projects. Meanwhile, institutions should utilize various internet platforms to organize student participation in events such as the "Internet+" College Student Innovation and Entrepreneurship Competition, using competitions as catalysts for learning and innovation. Furthermore, institutions should establish a campus platform for showcasing and commercializing I&E achievements, supporting the incubation and implementation of high-quality projects.

4.5 Improve the Comprehensive Digital Evaluation Mechanism for Effective Integration of Innovation, Entrepreneurship and Professional Education.

Moving away from the traditional, single-dimensional model of end-of-term grading, institutions should leverage the digital advantages of "Internet+" to establish a diversified, comprehensive evaluation system that integrates formative assessment, summative assessment, and internet-enabled quantitative assessment [12]. Formative assessment should rely on online teaching platforms to record students' daily performance, including course attendance, online interactions, assignment completion, group discussions, and practical training exercises [8]. Summative assessment should incorporate end-of-term exams, capstone projects, project outcomes, and competition achievements. Internet-enabled quantitative assessment should utilize big data platforms to integrate multi-dimensional information, including students' online learning data and practical training records. The evaluation framework should move beyond a teacher-only assessment model to include student self-assessment, peer assessment, industry mentor feedback, and external expert review. Concurrently, evaluation results should be fed back into teaching optimization, creating a virtuous cycle of evaluation, feedback, and improvement.

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