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Research and Practice on the Integration of Innovation and Entrepreneurship Education with Acupuncture and Tuina Professional Education

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Abstract Against the backdrop of the Healthy China Initiative and the new medical education paradigm, the health industry's demand for acupuncture and tuina professionals is shifting from traditional clinical-technical skills towards a "professional expertise + innovative operation" composite talent model. Promoting the deep integration of innovation and entrepreneurship education with acupuncture and tuina professional education represents a crucial direction for the reform of higher education in Chinese medicine. While domestic universities of Chinese medicine have initiated explorations into the integration of professional education and innovation-entrepreneurship education, practical challenges persist, including insufficient depth of curriculum integration, weak links between theoretical teaching and entrepreneurial practice, and a shortage of interdisciplinary faculty capacity. Drawing upon practical experience in reforming acupuncture and tuina professional teaching, this paper explores implementation pathways for profession-innovation integration within this discipline from five key dimensions: curriculum system restructuring, teaching model innovation, practical platform construction, faculty team building, and the establishment of a multi-dimensional evaluation system. It aims to provide practical references for similar specialties within Chinese medicine undertaking such integration reforms.

Key words Acupuncture and Tuina, Innovation and entrepreneurship education, Integration of professional education and innovation-entrepreneurship education, Teaching reform

0 Introduction

The Ministry of Education advocates integrating innovation and entrepreneurship education throughout the entire process of higher education talent cultivation, promoting its deep integration with professional education to achieve the synergistic development of professional knowledge, innovative thinking, and practical abilities. With the rapid development of the comprehensive health industry, the acupuncture and tuina sector is continuously evolving new business models such as wellness services, R&D of Chinese medicine physiotherapy products, online health services, and community-based Chinese medicine wellness programs. Consequently, market demands on graduates now extend beyond clinical diagnostic and treatment skills to require comprehensive innovation and entrepreneurship abilities, including market analysis, project planning, service innovation, and operational management. Currently, acupuncture and tuina programs in most universities of Chinese medicine predominantly focus on traditional professional knowledge and clinical skill training. Innovation and entrepreneurship education is often offered separately as general education courses, leading to a disconnect from core professional courses—a "two separate layers" phenomenon. This makes it difficult for students to translate their specialized acupuncture and tuina skills into innovative services or entrepreneurial ventures, resulting in insufficient cultivation of innovative awareness and market-oriented thinking. Institutions such as Shandong University of Chinese Medicine, Guangzhou University of Chinese Medicine, and Chengdu University of Chinese Medicine have begun exploring the integration of professional education and innovation-entrepreneurship education within their acupuncture and tuina programs, establishing practical bases, offering specialized courses, and leveraging academic competitions to drive innovation training. Some overseas universities of Chinese medicine also provide entrepreneurial practice environments through industry-academia collaboration and healthcare policy support. Nevertheless, gaps remain in areas like deep curriculum integration, the implementation of practical scenarios, and faculty collaboration. Therefore, exploring an integration model tailored to the characteristics of the acupuncture and tuina discipline holds significant practical importance for advancing professional teaching reform and cultivating composite talents in Chinese medicine.

1 Practical challenges in integration of professional education and innovation-entrepreneurship education for acupuncture and tuina

1.1 Insufficient depth of curriculum integration and imbalance between major and innovation-entrepreneurship content

Currently, some institutions merely add general entrepreneurship courses to their talent cultivation plans or superficially layer innovation-entrepreneurship content onto existing acupuncture and tuina professional courses, failing to achieve deep integration at the level of knowledge logic[1]. On the one hand, significantly in-

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creasing entrepreneurship-related teaching content risks encroaching on the instructional hours allocated to core professional courses like Meridian and Acupoint Theory, Acupuncture and Moxibustion Techniques, and Tuina Manipulation, thereby diluting the depth of specialized knowledge instruction. On the other hand, rigid adherence to traditional professional teaching content leaves innovation-entrepreneurship knowledge points superficial, lacking the complete logical chain connecting "professional problems, innovative solutions, and commercial implementation". For instance, teaching in courses like Meridian and Acupoint Theory often centers on acupoint indications and manipulation techniques, omitting content on how acupoint therapies can be transformed into wellness service products or market promotion strategies. This makes it difficult for students to establish connections between professional knowledge and industrial application.

1.2 Fragmented teaching-practice scenarios and lack of entrepreneurial practice platforms Traditional practical teaching for acupuncture and tuina primarily centers on clinical observation in hospitals and skills training workshops, with the training objectives focused predominantly on disease diagnosis and treatment capabilities. In contrast, innovation-entrepreneurship practice necessitates market-oriented scenarios such as market research, customer needs analysis, cost accounting, and project operation. Existing on-campus training platforms are mostly geared towards clinical simulation and lack industry-facing simulated entrepreneurial environments. Off-campus cooperative bases often emphasize clinical internships, with limited resources for entrepreneurial incubation-type practice. Students lack authentic market environments to conduct project exercises, resulting in many business plans and innovation projects remaining theoretical, difficult to implement, and rendering practical teaching superficial.

1.3 Mismatched interdisciplinary faculty competencies and lack of collaborative education mechanisms Acupuncture and tuina faculty members typically possess deep expertise in clinical practice and traditional teaching, with solid foundations in Chinese medicine. However, they generally lack practical experience in market operations and entrepreneurial project incubation. Conversely, instructors teaching innovation and entrepreneurship courses are familiar with entrepreneurial theory but possess limited understanding of acupuncture and tuina professional knowledge and the current state of industry development. Belonging to different teaching and research sections, these two groups of faculty lack regular joint teaching and research mechanisms, making it difficult for them to collaboratively develop integrated curricula or jointly supervise student projects. This faculty deficiency constrains the improvement of teaching quality in profession-innovation integration.

1.4 Monolithic evaluation methods and lack of long-term assessment mechanisms Traditional course assessment relies primarily on theoretical exams and skills operation scores as key evaluation metrics, emphasizing knowledge recall and clinical procedures. Innovation and entrepreneurship competencies, such as project planning, innovative solution design, and market research outcomes, are difficult to incorporate into the assessment system. Furthermore, the effectiveness of students' innovation and entrepreneurship abilities often manifests gradually during their post-graduation career development. Existing evaluations are mostly short-term classroom assessments, lacking industry feedback and post-graduation tracking. This makes it impossible to dynamically gauge the actual educational outcomes of the profession-innovation integration.

2 Practical pathways for integrating innovation and entrepreneurship education with acupuncture and tuina professional education

Grounded in the talent cultivation objectives of the acupuncture and tuina program, reforms are undertaken across five top-level dimensions: curriculum system, teaching model, practice platforms, faculty development, and evaluation system. The aim is to transition innovation and entrepreneurship education from being an "external add-on" to being embedded throughout the entire professional talent cultivation process[2].

2.1 Restructuring the integrated curriculum system for organic embedding of professional knowledge and innovation-entrepreneurship modules Adhering to the principle of "professional expertise as the foundation, innovation as the enabler", core professional teaching content is not diluted. Instead, innovation-entrepreneurship application modules are embedded within existing professional courses. Concurrently, interdisciplinary specialized courses are developed, integrating elements of curriculum-based ideological and political education. First, it is necessary to introduce industry application tasks into core courses. For example, the Meridian and Acupoint Theory course incorporates a teaching module on "Marketing Strategies for Featured Acupoint Therapies" and assigns practical tasks like "Commercial Design of Physiotherapy Services". This guides students to integrate acupoint functions with tasks such as project cost accounting, service pricing, and target audience analysis, transforming acupoint knowledge into wellness service proposals. Second, it is necessary to launch a specialized integrated course titled Innovative Applications and Business Practices of Acupuncture and Tuina, covering topics like health industry market analysis, marketing of Chinese medicine services, and entrepreneurial project management, thereby breaking down barriers between professional skills and business practice. Third, it is necessary to explore curriculum-based ideological elements, integrating concepts like "great physicians possess both skill and integrity" and the innovative inheritance of Chinese medicine culture into teaching. This guides students to base their innovations on traditional acupuncture and tuina techniques and fosters correct professional values[3].

2.2 Innovating teaching methods and models, promoting blended online-offline learning and combining project-based with case-based teaching It is necessary to shift away from traditional teacher-centered lectures towards establishing a student-centered teaching model. First, it is necessary to implement project-based learning using real-world projects as vehicles, such as "Campus Physiotherapy Experience Station" or "R&D of Characteristic Chinese Medicine Wellness Products". Students work in groups to complete the entire process—market research, project planning, solution design, and simulated operation—thereby consolidating their acupuncture and tuina professional skills and training entrepreneurial thinking throughout the project lifecycle. Second, it is necessary to conduct case-based teaching by collecting both successful and failed entrepreneurial case studies from the acupuncture and tuina industry, covering areas like operating chain physiotherapy institutions, innovative moxibustion products, and online tuina service platforms. It is necessary to organize student seminars to analyze these cases and distill key lessons and experiences from industry entrepreneurship. Third, it is necessary to adopt a blended online-offline teaching approach, utilize online platforms to disseminate industry policies, entrepreneurial case studies, and micro-lecture resources on theory, conduct offline sessions for practical skills training, group discussions, and face-to-face guidance from industry experts, thereby extending the boundaries of time and space for learning.

2.3 Constructing a three-tiered practice platform, connecting on-campus simulation, off-campus training and academic competitions It is necessary to construct a three-tiered practice platform encompassing "On – Campus Innovation – Entreprenehip Workshops—Off – Campus University – Industry Bases—Discipline – Specific Innovation and Entrepreneurship Competitions". On-campus: it is necessary to leverage the university's innovation and entrepreneurship center to establish simulated Chinese physiotherapy entrepreneurial workshops, create a simulated entrepreneurial environment where students conduct project simulations, refine service proposals, and engage in mock operations. Off-campus: it is necessary to collaborate with Chinese medicine institutions and health and wellness enterprises to co-build practical bases. This allows students to immerse themselves in authentic industry settings for internships and project incubation, gaining first-hand understanding of real industry needs[4]. It is necessary to fully leverage the educational value of academic competitions, utilize events like the China International College Students' Innovation Contest and the "Challenge Cup" to refine acupuncture and tuina innovation projects—such as Chinese herbal acupoint patches, novel cupping therapy devices, and tuina service platforms, promote learning and innovation through competition, facilitating the refinement and output of student innovation achievements.

2.4 Building a combined full-time and part-time faculty team and improving interdisciplinary teaching research and training mechanisms It is necessary to form a composite teaching team comprising "Professional Faculty + Innovation – Entrepreneurship Mentors + Industry Experts". On the one hand, it is necessary to provide professional education and innovation-entrepreneurship education training for in-house acupuncture and tuina faculty, encouraging them to conduct in-depth research and undertake temporary positions within health enterprises to address gaps in industry practical experience. On the other hand, it is necessary to recruit industry entrepreneurs and corporate technical leaders as part-time external mentors to participate in course teaching and project guidance. It is necessary to establish a regular cross-departmental teaching research system, facilitate joint discussions between acupuncture and tuina professional faculty and innovation-entrepreneurship instructors on course design, teaching cases, and student project supervision. This addresses the knowledge barriers between the two faculty groups and enhances their capacity for integrated teaching.

2.5 Constructing a "three-dimensional" multi-faceted integrated education evaluation system It is necessary to establish a three-dimensional evaluation system encompassing "Professional Competency Assessment + Innovation – Entrepreneurship Literacy Assessment + Industry Feedback Assessment". This system balances quantitative metrics with qualitative evaluation, moving away from an assessment model solely reliant on exam scores. Within the student assessment dimension, beyond traditional theoretical and skills evaluations, it is necessary to incorporate process-oriented assessment indicators such as business plans, market research reports, innovation project outcomes, and competition participation. Within the teaching quality evaluation dimension, it is necessary to regularly assess course design, practical guidance, and faculty teaching proficiency, collect feedback from both teachers and students to dynamically adjust teaching strategies[5]. It is necessary to establish a long-term tracking evaluation mechanism, connect with industry enterprises to collect data on graduates' career progression and the implementation status of their projects, utilize this industry feedback as a crucial evaluation basis for continuously optimizing the integrated teaching program.

3 Conclusions

Promoting the deep integration of innovation and entrepreneurship education with acupuncture and tuina professional education is an inevitable choice for reforming higher education in Chinese medicine under the new medical paradigm. It is also a crucial pathway to meet the talent demands of the comprehensive health industry and to achieve the goal of preserving the essence of Chinese medicine while pursuing innovation. Integration of professional education and innovation-entrepreneurship education does not mean simply adding entrepreneurship courses to professional teaching. Instead, it entails embedding the cultivation of innovative thinking, market awareness, and entrepreneurial abilities throughout the entire acupuncture and tuina talent cultivation

process. Building upon a solid foundation of core professional competencies, it broadens students' career development paths, aiming to cultivate composite talents in Chinese medicine who possess both professional expertise and practical innovation capabilities. The five-pronged reform framework encompassing curriculum, pedagogy, practice platforms, faculty, and evaluation constructed in this study, refined through pilot teaching practice, can be promoted to acupuncture and tuina programs nationwide in universities of Chinese medicine. Subsequent efforts require sustained deepening of university-industry collaboration to further integrate the chains of teaching, practice, and achievement transformation. Continuously improve the integrated talent cultivation model to support the high-quality development of the Chinese medicine health industry.

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tolC, *aspA*, and *bfr* were significantly upregulated, whereas *glpF* expression was significantly downregulated. These findings confirm that deletion of the *kdpD* gene substantially alters the transcriptional profile of numerous genes in *V. alginolyticus*. This study provides an initial elucidation of the regulatory role of the *kdpD* gene on the transcriptome of *V. alginolyticus*, thereby establishing a theoretical basis for future investigations into the biological functions of the *tyeA* gene and the development of subunit vaccines.

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