Exploring the Pathways for Building Application-oriented Teaching Teams in Local Undergraduate Institutions Driven by "Innovation and Entrepreneurship"

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Abstract: Driven by "innovation and entrepreneurship" (Double Innovation), local undergraduate colleges need to cultivate innovative and entrepreneurial talents. This paper explores the construction paths of application-oriented teaching teams, proposing strategies such as optimizing team structure, deepening teaching reforms, strengthening industry-university cooperation, and improving the practical resource system. By establishing diverse teaching teams and promoting an "student-centered" innovative teaching model, deepening industry-university-research collaboration, and building industry-based training platforms, the quality of practical teaching is enhanced. Meanwhile, a systematic practical resource system is built to improve students' engineering practice abilities. These measures help achieve the organic integration of theory and practice, cultivate application-oriented talents with innovation capabilities, provide talent support for local economic development, and promote the deepening of "Double Innovation" education.

Keywords: Application-Oriented Teaching Teams; Industry-Education Integration; Teaching Reform; Practical Resource System

1. Research Background

On May 13, 2010, the Ministry of Education, in its *Opinions on Vigorously Promoting Innovation and Entrepreneurship Education in Higher Education Institutions and University Students' Independent Entrepreneurship*, explicitly emphasized that innovation and entrepreneurship education, as a pedagogical concept and model, is a response to national strategic needs and the trends of socio-economic development. The comprehensive implementation of innovation and entrepreneurship education (commonly referred to as "double innovation" or "Entrepreneurship and innovation" education) within higher education institutions holds profound practical significance and strategic value. It propels higher education toward scientific advancement, deepens education reform, and enhances the quality of talent cultivation. In recent years, "double innovation" education has surged across various domains, generating widespread and profound impacts [1]. Not only has it injected fresh momentum into economic growth, but it has also ignited enthusiasm for personal entrepreneurship. In the field of education, the focus of teaching team development in universities has undergone significant shifts. Evaluation of educators now transcends student performance, teaching outcomes extend beyond theoretical research, and teaching management increasingly encompasses guidance on learning and holistic quality development. Furthermore, individual evaluations have expanded to include academic contributions and pedagogical innovation.

However, most local undergraduate institutions in China currently exhibit insufficient emphasis on the development of teaching teams. Many members of these teams transition directly from being students to educators without accumulating sufficient practical experience, thereby struggling to fully meet the talent cultivation demands of "double innovation" education. Consequently, facilitating the transformation and upgrading of teaching teams and constructing application-oriented teaching teams that align with the requirements of "double innovation" education has become an urgent priority.

2. Current Research Status

In alignment with the principles outlined in the *Opinions on Implementing the Undergraduate Teaching Quality and Teaching Reform Project* (Document No. 1, 2007) issued by the Ministry of Education and the Ministry of Finance, the joint initiative proposed the establishment of teaching team development projects. These projects aim to fundamentally enhance the quality of education through the "mentorship" model, wherein experienced educators guide younger faculty members.

In the field of "double innovation" education, foreign countries have taken an early lead, placing a strong emphasis on cultivating students' practical abilities. Simultaneously, significant importance is placed on constructing teaching teams for "double innovation" education, resulting in the emergence of dual-capacity teams proficient in both academic research and engineering applications [2]. In contrast, the development of "double innovation" education in China began relatively late. Although Chinese universities are gradually prioritizing the construction of first-class teaching teams and curricula for "double innovation" education, the current system remains incomplete. Consequently, second-classroom initiatives, characterized by diverse formats, high student engagement, and strong continuity in practice, exhibit significant advantages. These initiatives not only effectively stimulate students' innovation consciousness but also comprehensively enhance their innovation and entrepreneurship capabilities.

In 2017, the General Office of the State Council explicitly advocated for deepening the "integration of enterprises into education" reform, encouraging and supporting enterprises to actively participate in higher education teaching reforms. For application-oriented undergraduate institutions, it is imperative to align with regional economic and industrial development needs and promote in-depth industry-education integration. The second classroom in "double innovation" education necessitates the organic integration of interdisciplinary knowledge and the active participation of enterprises, thereby effectively integrating and utilizing resources from both universities and enterprises. This approach aims to comprehensively enhance educational outcomes and the cultivation of practical competencies.

Amid the rapid development of industry-education integration and "double innovation" education, application-oriented undergraduate institutions must strengthen interdisciplinary and inter-organizational collaboration. This involves constructing high-quality innovation and entrepreneurship education teams to enhance students' innovative capabilities and foster synergies between regional education and local economic development, thereby underscoring the application-oriented mission of these institutions. Li Xue et al. [3], based on practical teaching experiences, proposed a "six-in-one" teaching team construction model grounded in TRIZ innovation theory. This model focuses on six dimensions: theory, courses, competitions, platforms, practice bases, and efficient utilization of experimental equipment, aiming to improve teaching outcomes. Similarly, Ma Liting et al. from Fujian Jiangxia University [4] systematically reviewed the "six features and five measures" for constructing e-commerce innovation and entrepreneurship teaching teams from the perspective of "double innovation," offering valuable insights for application-oriented institutions. Zhang Fan et al. from Anhui Xinhua University [5] explored strategies for developing teaching teams in the field of electronic information. They emphasized a student-centered, outcome-oriented, and practice-first approach, advocating for optimizing team structures, improving curriculum and practice resource systems, and advancing teaching reforms.

Furthermore, Han Zhu from Nanchang Aviation University [6] highlighted the need to strengthen top-level design, nurture team leaders, optimize structures, and refine incentive mechanisms to enhance the cohesiveness and distinctiveness of ideological and political teaching and research teams. Zhu Chunxiao [9] focused on the challenges faced by application-oriented teaching teams and proposed innovative pathways to improve overall team quality. Using electronic information disciplines as a case study, this paper further explores the construction pathways and practical methodologies for teaching teams in local undergraduate institutions.

3. Construction Methodology for Application-Oriented Teaching Teams in Local Institutions

Using electronic information disciplines as a case study, this study investigates construction strategies for application-oriented teaching teams through four dimensions: optimizing team structures, promoting in-depth teaching reforms, refining curriculum resource systems, and establishing an integrated three-pronged practical teaching system. The methodology for constructing application-oriented teaching teams is illustrated in Figure 1.

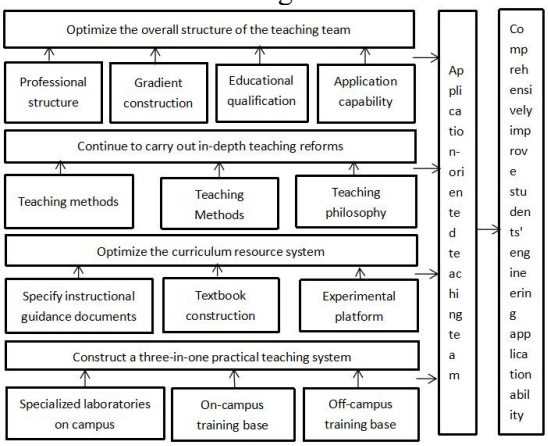

Figure 1. Overall Framework of the Research

3.1 Diversified Development of Application-Oriented Teaching Teams

Teaching teams in electronic information disciplines should build upon existing professional structures, optimize team composition, and adopt the Outcome-Based Education (OBE) philosophy to refine a seamless “teaching-practice-employment” connection model.

3.1.1 Optimizing Team Structures

Guided by the classification of teaching teams into "teaching-oriented," "academic-research-oriented," and "dual-role" (teaching and industry) types, educators should be strategically assigned to general education courses, online platforms, and core professional courses, leveraging their respective strengths. Steady progress should be made in initiatives such as renowned teacher cultivation strategies, mid-career talent development, and professional ethics enhancement. Facilitating both internal and external team exchanges can continuously improve the overall quality of team development.

3.1.2Enhancing Teacher Tiers

Implementing the "recruit-cultivate-retain-utilize" strategy is key to optimizing talent structures. On one hand, efforts should be made to recruit high-level talents; on the other hand, existing faculty should be identified and developed as key contributors. Faculty should be encouraged to engage in visiting scholar programs, further studies, and external training opportunities. Internal incentive and supervision mechanisms should ensure team efficiency, promote collaborative growth among senior, mid-level, and junior educators, and elevate the team’s overall competencies.

3.1.3 Improving Educational Qualifications

By employing a mentorship model, young teachers should be paired with highly qualified mentors. Initiatives such as doctoral studies, faculty guidance programs, and "young teacher mentorship systems" should be implemented to raise educational qualifications. A competitive environment supported by incentive mechanisms can foster personalized development, while layered management strategies help cultivate backbone educators and promote specialized growth.

3.1.4 Strengthening Practical Competencies

A "go out, bring in" strategy is recommended, where teachers are regularly dispatched to enterprises for job placements or dual-role (teaching and industry) training. Meanwhile, engineers from enterprises can be invited to serve as part-time faculty, contributing to curriculum delivery and the development of practical training bases. This symbiotic approach enhances students’ practical competencies, aligning with societal demands.

3.2 Sustained Advancement of Deep Teaching Reforms

In "double innovation" practice teaching, challenges identified during the process can be addressed through scientific research, with findings subsequently applied in experimental teaching to validate their feasibility and effectiveness. This iterative process encourages the transformation of research outcomes, facilitating the synergistic development of teaching and research. For application-oriented teaching teams in electronic information disciplines, reforms should focus on teaching methods, techniques,

and philosophies.

3.2.1 Innovating Teaching Methods

Diverse teaching methods, such as interactive and case-based approaches, should be adopted to match course content. By shifting the locus of learning agency to students, these methods foster student-centered learning environments that stimulate motivation, innovation, critical thinking, and practical skills.

3.2.2 Employing Diverse Teaching Tools

Modern educational tools, including multimedia presentations, online simulations, smart classrooms, and flipped classrooms, should be integrated into teaching strategies. Blending online and offline interactions enhances class participation and boosts students' interest and initiative.

3.2.3 Optimizing Teaching Philosophies

Through active discussion and exchange among educators, innovations in teaching content, methods, and tools can be achieved. By refining application- and skill-oriented talent cultivation models, educational philosophies are modernized to provide students with more effective and pragmatic learning experiences.

3.3 Deepening Industry-Academia Integration and Optimizing Curriculum Resources

Universities, as the primary agents of talent cultivation, and enterprises, as key supporters of market-relevant education, must engage in synergistic collaboration. The talent cultivation model under university-enterprise cooperation requires bidirectional engagement and continuous innovation to refine cooperation mechanisms.

3.3.1 Improving Teaching Guidance Documents

Application-oriented teaching teams should focus on the "three outlines and two manuals" (curriculum, experimental, and internship syllabi; experimental and internship guides), progressively enhancing instructional documentation for each course. By offering actionable resources for theory, experimentation, and practice, teaching processes can be standardized to ensure goal alignment and quality assurance.

3.3.2Optimizing Textbook Development

Adhering to the characteristics of application-oriented universities, course textbooks should be developed to align with market demands under the guidance of university-enterprise collaboration. Industry professionals should be encouraged to co-author textbooks, and collaborative applications for provincial and national-level high-quality textbook projects should be pursued. This ensures the creation of distinctive and industry-relevant course resources, contributing to the cultivation of urgently needed application-oriented talents.

3.3.3Strengthening Experimental Platforms

Experimental resources should be consolidated to develop shared platforms for university-enterprise collaboration. By introducing advanced industrial equipment, on-campus practical training platforms can be constructed to align teaching content with job-specific skills. This integration enhances students' engineering literacy and practical skills while fostering a mutually beneficial relationship between universities and enterprises.

3.4 Establishing a Comprehensive Practical Resource System

Teaching teams in electronic information disciplines should focus on three aspects: practical teaching systems, industry-academia-research cooperation, and base development. Guided by principles of hierarchical design, categorized implementation, and phased advancement, a practice-centered resource system should be developed, creating a seamless "teaching-practice-employment" talent cultivation model.

3.4.1Constructing Multilevel Practical Teaching Systems

By introducing enterprise-grade or industrial-level engineering equipment, comprehensive and modular practical teaching systems should be built to ensure that teaching content aligns closely with engineering practices, thus cultivating students' ability to address real-world problems.

3.4.2 Deepening Industry-Academia-Research Collaboration

Collaborative channels with enterprises and research institutions should be expanded to promote technology transfer and improve the quality of research services. Adhering to the progressive principle of "basic competencies–professional skills–integrated abilities," efficient industry-academia-research

collaboration mechanisms should be established. Efforts should also be made to apply for Ministry of Education's collaborative education projects and undertake application-oriented research projects, achieving a deeper integration of teaching, research, and industry.

3.4.3Establishing a Three-Pronged Practical Platform

Resources from campus laboratories and training bases should be integrated with partnerships established with leading enterprises to construct a "campus laboratory–on-campus training base–off-campus enterprise base" triadic practical platform. Enterprise-oriented practice environments can provide comprehensive learning and design guidance to enhance students' employability and competitiveness.

4 Conclusion

Driven by the "double innovation" initiative, the construction of application-oriented teaching teams in local undergraduate institutions faces both opportunities and challenges. By optimizing team structures, advancing teaching reforms, deepening university-enterprise collaboration, and establishing practical resource systems, teaching quality and students' innovative capabilities can be significantly enhanced. Teaching teams must adapt their curricula and methods flexibly to align with professional characteristics and market needs, actively promoting a student-centered educational philosophy. Integrating theory and practice remains paramount.

Moreover, university-enterprise cooperation serves as a critical driver for educational reform. Measures such as co-developing training platforms and curriculum materials enable deeper industry-academia-research integration, enhancing the relevance and practicality of talent cultivation. Through the gradual implementation of these strategies, local undergraduate institutions can nurture high-quality application-oriented talents that meet societal demands, thereby driving regional economic and social development and contributing meaningfully to the "double innovation" initiative.

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