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Exploration and Practice of Cultivating Innovative and Entrepreneurial Abilities for Students majoring in Cultural Management in Advantageous Engineering Universities under the Background of New Liberal Arts

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Abstract: Based on the practical exploration of Hubei University of Automotive Industry, this article systematically analyzes the current situation and problems of cultivating innovation and entrepreneurship abilities of students majoring in literature and management in engineering advantageous universities under the background of new liberal arts, and proposes a double helix training mode based on "engineering empowerment and integration of literature and management". By constructing an interdisciplinary curriculum system, a collaborative practice platform between schools and enterprises, and an innovative evaluation mechanism, this article elaborates in detail on the implementation path and guarantee conditions of this model, verifying its effectiveness in enhancing students' innovative thinking, practical ability, and employment competitiveness, providing talent support for local economic transformation and upgrading, and Formed a replicable experience.

1 Introduction

With the acceleration of a new round of technological revolution and industrial transformation, traditional liberal arts education is facing severe challenges in cultivating compound innovative talents [1-3]. Currently, the widespread application of digital economy and artificial intelligence technology has put forward higher requirements for higher education. Traditional liberal arts education is no longer able to meet the demand for interdisciplinary and composite talents in the new era due to clear disciplinary boundaries, single teaching content, and weak practical links. Especially in advantageous engineering universities, there are obvious shortcomings in the cultivation of innovation and entrepreneurship abilities for students majoring in literature and management, which urgently need to be addressed through interdisciplinary integration and practice oriented teaching reforms [4].

In this context, this article proposes a dual helix training model of "engineering empowerment and integration of literature and management". This model is supported by engineering technology and guided by cultural management thinking. Through interdisciplinary curriculum system design, school enterprise collaborative practice platform construction, and innovative evaluation mechanism construction, it achieves deep integration between engineering and cultural management majors. Specifically, engineering empowerment emphasizes enhancing students' practical abilities and innovative consciousness through technical tools and methods; The integration of literature and management focuses on cultivating students' interdisciplinary thinking and comprehensive application abilities. Both gradually enhance students' innovation and entrepreneurship abilities through a spiral upward training path, meeting the demand for versatile talents in the new era. Through theoretical research and practical exploration, this article aims to provide new ideas and practical paths for the cultivation of talents in cultural management majors in engineering advantage universities, while also providing strong talent support for local economic transformation and upgrading.

2 Analysis of the Current Situation of Innovation and Entrepreneurship Education in Cultural Management Majors under the Background of New Liberal Arts

2.1 Unclear Teaching Objectives and Positioning

There are obvious limitations in the teaching objectives of liberal arts majors in engineering advantage universities, which overly focus on the imparting of traditional liberal arts knowledge and neglect the cultivation of interdisciplinary integration and innovation and entrepreneurship abilities. This vague positioning directly leads to the inability of curriculum design and teaching content to meet the demand for versatile talents in the digital economy era [5]. There is a lack of interdisciplinary courses in the curriculum system that organically combine engineering technology with cultural management knowledge. Students find it difficult to obtain a comprehensive knowledge system and skill training, which cannot meet the requirements of modern society for composite talents with innovative thinking and practical abilities.

2.2 The Dual Shortcomings of Practical Teaching Effectiveness and Form

There are dual shortcomings in the evaluation mechanism and teaching form of current practical teaching in universities [6]. On the one hand, the evaluation mechanism places too much emphasis on result orientation, mainly focusing on students' final grades or works, neglecting the dynamic monitoring and comprehensive evaluation of students' learning process [7]. This evaluation method cannot truly reflect students' practical ability and innovative thinking development level, and it is also difficult to provide effective teaching feedback. Teachers often only focus on the final results of experimental reports or course designs, while neglecting the cultivation and evaluation of key competencies such as innovative thinking, problem-solving ability, and teamwork ability in students during the experimental process [8]. On the other hand, the form of practical teaching is relatively single, mostly staying at the level of traditional simulation experiments and course design, lacking project driven practical teaching that is closely integrated with the actual needs of enterprises. In addition, the updating of practical teaching content lags behind, making it difficult to reflect the latest trends and technological advancements in the industry [9]. Some universities still focus on simple case analysis or simulation operations in practical teaching, lacking real enterprise project backgrounds and practical operation opportunities, which makes it difficult for students to quickly adapt to workplace needs after graduation. The interaction between the singularity of the evaluation mechanism and the backwardness of teaching forms further exacerbates the inadequacy of practical

teaching effectiveness, making it difficult to meet the demand for versatile talents in the new era.

2.3 Insufficient Interdisciplinary Ability of the Teaching Staff

Teachers in cultural management majors often have a strong background in humanities and social sciences, but their abilities in engineering technology and practical teaching are relatively weak. At the same time, some teachers lack practical experience in enterprises, making it difficult to organically integrate industry needs with teaching content. This teacher structure limits the depth and breadth of interdisciplinary teaching, and affects the cultivation of students' innovative thinking and practical abilities. In courses involving technology fields such as data analysis and artificial intelligence, due to the limitations of teachers' own technical abilities, they are unable to effectively impart relevant knowledge and skills, resulting in low teaching quality.

2.4 Lack of Systematicity and Integration in the Curriculum System

The curriculum system of cultural management majors often lacks systematicity and integration, and there is a lack of organic connections between courses, resulting in repetitive or fragmented content. The curriculum of some universities still focuses on imparting knowledge from a single discipline, lacking interdisciplinary comprehensive courses and project-based courses, which makes it difficult for students to form a complete knowledge system and comprehensive abilities in the learning process. The shortcomings of this curriculum system make students lack the ability to comprehensively apply multidisciplinary knowledge to analyze and solve complex social problems and practical work scenarios [10].

2.5 Relatively Backward Teaching Methods and Means

In terms of teaching methods, some universities still rely mainly on traditional lecture methods, lacking diverse teaching methods such as interactive, heuristic, and case-based approaches. This single teaching method is difficult to stimulate students' interest and initiative in learning, and is not conducive to cultivating students' innovative thinking and practical abilities. In the classroom, teachers often focus on one-way knowledge transmission, while students passively receive knowledge and lack opportunities to participate in discussions and practical operations, resulting in a lack of enthusiasm and creativity in the learning process.

2.6 Insufficient and Unreasonable Allocation of Teaching Resources

Some universities have relatively insufficient investment in practical teaching resources, with outdated laboratory equipment and limited quantities, which cannot meet the needs of students for practical teaching. In addition, the allocation of practical teaching resources also has unreasonable aspects, lacking cooperation and sharing mechanisms with enterprises and social institutions, resulting in low resource utilization efficiency. Some universities' laboratory equipment cannot meet the needs of students for complex experiments and project practices, and cooperation with enterprises is only superficial, failing to truly achieve resource sharing and complementary advantages.

In summary, there are six main shortcomings in cultivating composite talents in the cultural and management majors of engineering advantage universities, as shown in Figure 1. These issues are intertwined and limit the cultivation of innovation and practical abilities among students majoring in literature and management, and urgently need to be addressed through systematic reforms.

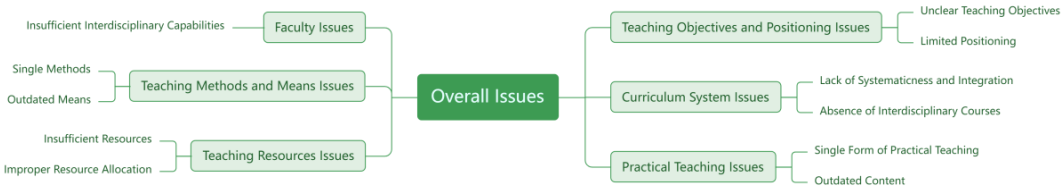

Figure 1 Analysis of Current Situation

3. Construction of Innovation and Entrepreneurship Education Model Based on "Empowering Engineering and Integrating Literature and Management"

3.1 Proposal of Theoretical Framework

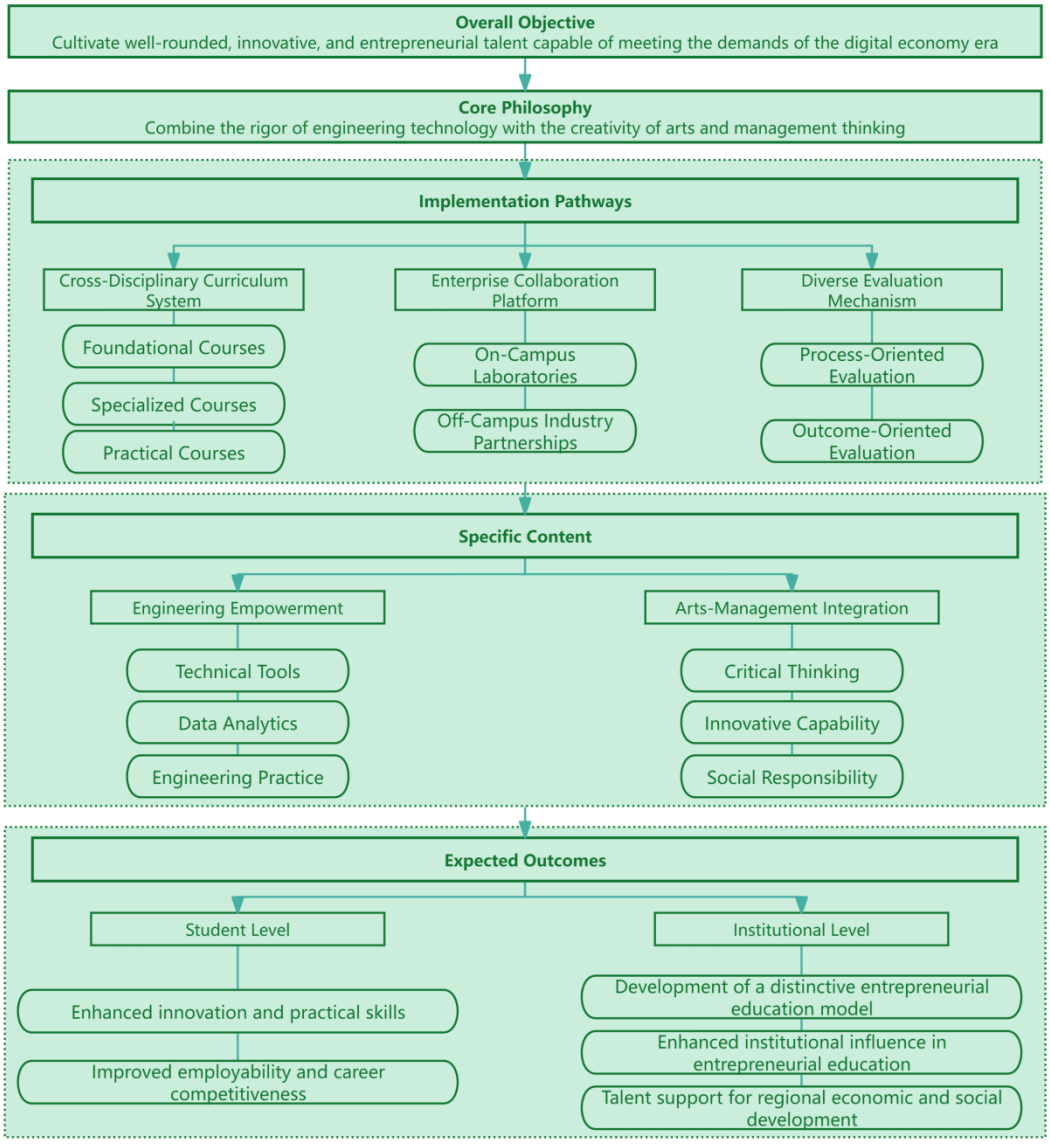

Figure 2 Theoretical framework of "Empowering Engineering and Integrating Literature and Management"

This article proposes a theoretical framework for entrepreneurship and innovation education that combines engineering empowerment and cultural management (see Figure 2). This framework focuses on interdisciplinary integration, emphasizing the organic combination of rigor in engineering technology and creative thinking in cultural management, breaking through traditional disciplinary boundaries, and constructing a talent cultivation model of "strong foundation, strong integration, and strong practice". The proposal of the framework aims to solve the problems of vague teaching objectives, single practical teaching forms, and insufficient interdisciplinary abilities of teachers in the existing education model, and provide a systematic path for cultivating innovative and entrepreneurial abilities for students majoring in literature and management. Through the empowerment of engineering technology, students can master cutting-edge technological tools such as data analysis and artificial intelligence; Through the integration of cultural management thinking, students can apply critical thinking and innovative abilities from humanities and social sciences in complex socio-economic scenarios, ultimately achieving a deep integration of technology and humanities, and cultivating compound talents with innovative spirit and practical ability for the digital economy era.

3.2 Design of Practical Teaching Mode

3.2.1 Spiral Rising Mode

This model adopts a modular curriculum design, which divides course content into levels of difficulty and depth. Students gradually deepen their understanding and application of interdisciplinary knowledge in a progressive learning process. After each course, students are required to submit a detailed learning report, which includes their mastery of the course knowledge, case analysis of practical applications, and a summary of their personal thinking development. Through this approach, teachers can comprehensively evaluate students' learning outcomes and provide reference for the design of subsequent courses. This model not only helps students build a complete knowledge system, but also cultivates their ability to think independently and analyze comprehensively.

3.2.2 Collaborative Tutoring Model between Schools and Enterprises

This model establishes a "dual mentor system", where university teachers and enterprise experts jointly guide students to complete practical projects. University teachers are responsible for imparting theoretical knowledge and providing academic guidance, while enterprise experts provide practical experience and professional advice based on industry needs. The relationship between mentors and students is dynamically adjusted based on learning progress and interests to ensure the pertinence and effectiveness of guidance. Students can choose mentors based on their interests and receive personalized guidance in practice. This model helps students better understand industry demands, enhance their practical abilities and career competitiveness.

3.2.3 Simulation Operation Mode

This model relies on campus laboratories and virtual simulation platforms to provide students with a simulated operating environment in real scenarios. Under the guidance of the mentor, students engage in targeted imitation operations, gradually mastering core skills, and ultimately achieving flexible transfer of skills. The evaluation methods include personalized evaluations by mentors on their mastery of each stage, as well as feedback from students' performance in simulated operations. Through this approach, students can not only master basic skills, but also develop the

ability to solve complex problems in practice.

3.2.4 Comprehensive Training Mode

This model combines laboratory simulations with off campus internships to help students apply their learned knowledge comprehensively to solve practical problems. Laboratory simulation provides students with a safe and controllable practical environment, while off campus internships allow students to exercise their abilities in real-life scenarios. The evaluation criteria are divided into five levels: excellent, good, average, passing, and failing, which comprehensively reflect students' learning outcomes. Through this model, students can enhance their comprehensive abilities through the combination of theory and practice, laying a solid foundation for their future career development.

3.3 Guarantee conditions for practical teaching

3.3.1 Building a multidimensional practical teaching evaluation system

To ensure the quality of practical teaching, it is necessary to establish a scientific and reasonable evaluation system. The system should focus on process evaluation, with a particular emphasis on students' participation, innovative thinking, teamwork ability, and problem-solving skills in practical learning. At the same time, through regular classroom questioning, group discussions, periodic reports, and other forms, students' learning progress and knowledge mastery can be timely understood. Summative evaluation serves as a supplement, comprehensively assessing students' learning outcomes through the presentation of final practical results, project reports, and exams. In addition, the evaluation system should also include the assessment of teachers' teaching effectiveness, promoting teachers to continuously improve teaching methods and content and enhance teaching quality through student feedback, peer evaluation, and analysis of teaching outcomes.

3.3.2 Strengthen the construction of interdisciplinary teaching staff

A high-quality teaching staff is the key to the success of practical teaching. Universities should enhance teachers' interdisciplinary teaching ability and practical guidance level through various means. On the one hand, encourage teachers to intern in enterprises, participate in practical project research and development, and understand the latest industry trends and technological needs; On the other hand, organizing teachers to participate in professional training and industry exchange activities can broaden their academic horizons and practical experience. At the same time, universities should encourage teachers to participate in horizontal research projects, collaborate with enterprises to carry out scientific research projects, and promote the deep integration of academia and practice. Through these measures, we aim to cultivate a "dual teacher" teaching team that possesses both profound theoretical knowledge and rich practical experience, providing a solid talent guarantee for practical teaching.

3.3.3 Improve the supporting facilities for practical teaching

Advanced practical teaching facilities are an important guarantee for improving the quality of practical teaching. Universities should update laboratory hardware equipment and teaching software in a timely manner to ensure that practical teaching content is synchronized with the latest industry technologies. For example, introducing a simulation trading system for automotive finance,

allowing students to experience real financial trading processes in a simulated environment and master market analysis and risk assessment skills; Build an intelligent logistics scheduling platform to enable students to apply advanced logistics management software for practical operations in goods distribution and warehousing management. In addition, universities should strengthen cooperation with enterprises, establish off campus practice bases, and provide students with more opportunities to participate in practical projects. By improving practical teaching facilities, creating a more authentic and efficient learning environment for students, enhancing their practical abilities and innovative thinking.

4. Practical Application and Effect Analysis

4.1 Implementation Path of Practical Teaching

The implementation path of practical teaching covers four key links: course module design, practical platform construction, teaching method optimization, and evaluation mechanism improvement, forming a systematic and hierarchical teaching implementation framework, as shown in Figure 3. This path comprehensively enhances students' practical abilities and innovative thinking by integrating interdisciplinary curriculum development, enterprise practice platform construction, innovative teaching methods, and multi-dimensional evaluation systems. The course module design is centered around practical cases and project-based learning, with a practical platform built through school enterprise cooperation to provide real-life scenarios. The teaching method optimization adopts CDIO engineering education mode and blended online and offline teaching, and the evaluation mechanism introduces SOLO classification method to construct a three-dimensional evaluation system. These links complement each other and jointly promote the efficient implementation and effectiveness improvement of practical teaching.

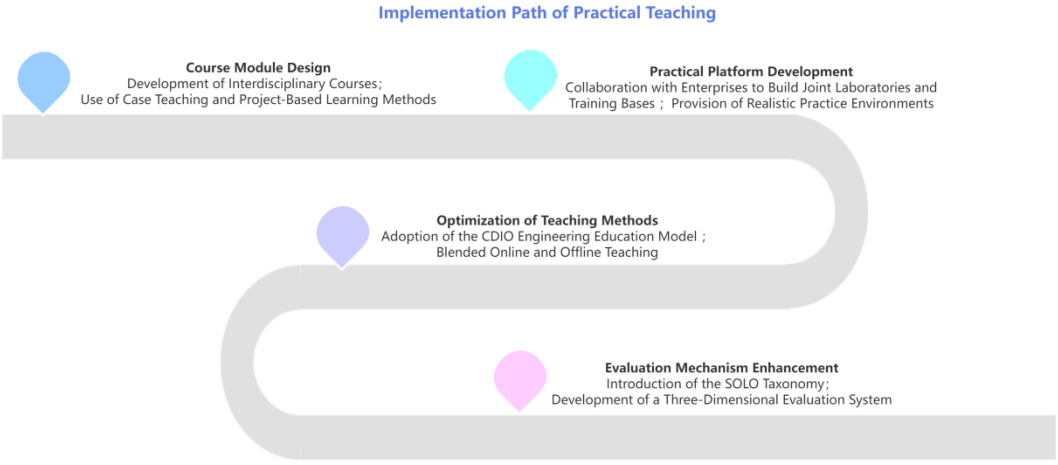

Figure 3 Implementation Path Flow Chart of Practical Teaching

4.1.1 Course Module Design

The project team has developed 12 interdisciplinary courses, including "Digital Economy and Innovation Management" and "Intelligent Transportation and Logistics Optimization". These courses adopt case teaching and project-based learning methods, combining theoretical knowledge with practical cases. In the course of "Digital Economy and Innovation Management", students learn how to use big data analysis tools for market forecasting and decision support by analyzing

actual digital transformation cases of enterprises. In the course of "Intelligent Transportation and Logistics Optimization", students use simulation software to design intelligent transportation systems and optimize logistics distribution routes. Through these courses, students not only acquire interdisciplinary theoretical knowledge, but also improve their practical skills.

4.1.2 Construction of Practice Platform

The project team has collaborated with companies such as Dongfeng Motor and SF Technology to jointly establish the "Automotive Industry Innovation Laboratory" and "Cross border E-commerce Training Base". These platforms provide students with a real practical environment. At the "Automotive Industry Innovation Laboratory", students can participate in projects such as simulated trading in automotive finance and research on intelligent driving technology; At the 'Cross border E-commerce Training Base', students learn about international trade processes and market rules through practical operation of cross-border e-commerce platforms. Corporate mentors regularly participate in guidance to ensure that students can apply theoretical knowledge to solve practical problems.

4.1.3 Optimization of Teaching Methods

The project team adopts the CDIO (Conceptual Design Implementation Operate) engineering education model, combined with blended online and offline teaching, to enhance students' practical abilities and innovative thinking. Online, students acquire theoretical knowledge through learning platforms, participate in online discussions, and operate virtual laboratories; Offline, students engage in practical operations and project practice in laboratories and corporate practice bases. For example, in the course of "Intelligent Transportation and Logistics Optimization", students learn traffic flow analysis theory online, design optimization plans through laboratory simulation software offline, and conduct on-site verification at the enterprise base. This blended learning model not only enhances students' interest in learning, but also strengthens their hands-on ability and innovative consciousness.

4.1.4 Improvement of Evaluation Mechanism

The project team introduced the SOLO (Structure of the Observed Learning Outcome) classification method and constructed a three-dimensional evaluation system of "process oriented+summative+enterprise feedback". Process evaluation includes classroom participation, group discussions, stage reports, etc., accounting for 40% of the total grade; Summative evaluation includes course assignments, final exams, and project reports, accounting for 30% of the total grade; Enterprise feedback is based on the evaluation of enterprise mentors and students' internship performance, accounting for 30% of the total score. Through this multidimensional evaluation system, students' learning outcomes and practical abilities are comprehensively reflected. For example, in the "Automotive Industry Innovation Laboratory" project, students' performance is not only evaluated by mentors, but also combined with feedback from corporate mentors to ensure the objectivity and comprehensiveness of the evaluation results.

4.2 Application Effect

4.2.1 Significant Improvement in Students' Innovation and Practical Abilities

By implementing this model, the participation rate of students in innovation and

entrepreneurship competitions has increased by 40%, and the number of awards has increased by 65% year-on-year. Among them, the "New Energy Vehicle Sharing Platform" project developed by a certain entrepreneurial team won the gold medal in the provincial competition and successfully landed in Shiyan City, driving local employment. This project optimizes the allocation of urban transportation resources and significantly improves transportation efficiency by integrating intelligent transportation technology and sharing economy models. The students not only demonstrated excellent technical skills in the project, but also demonstrated strong market analysis and business model design abilities. In addition, many students have achieved good results in the "Internet plus" Undergraduate Innovation and Entrepreneurship Competition, which further proves the effectiveness of this model in cultivating students' innovation ability.

4.2.2 Enhancement of Graduates' Employment Competitiveness

Enterprise feedback shows that 85% of graduates possess interdisciplinary problem-solving skills and can quickly adapt to job requirements. For example, multiple graduates have held core positions in Dongfeng Motor's finance department, demonstrating strong comprehensive qualities and innovative consciousness. These graduates not only have solid professional knowledge, but also possess excellent data analysis skills and innovative thinking, and are able to propose innovative solutions in practical work. Enterprises generally believe that these graduates excel in team collaboration, problem-solving, and project management, and are able to quickly integrate into the work environment and contribute to the development of the enterprise.

4.2.3 School Enterprise Cooperation and Regional Economic Contribution

The project team has signed long-term cooperation agreements with 15 enterprises to jointly build 4 industry university research bases. Through school enterprise collaboration, the school provides data support and technical consulting services to local enterprises, achieving a deep integration of the education chain and the industry chain. The intelligent driving project in cooperation with Dongfeng Motor not only provides practical opportunities for students, but also helps enterprises optimize intelligent driving algorithms and enhance product competitiveness. In addition, the logistics optimization project between the school and SF Express Technology has significantly improved the logistics efficiency of enterprises by introducing big data analysis and artificial intelligence technology. These collaborations not only inject new vitality into the local economy, but also provide students with rich practical opportunities, promoting high-quality development of the regional economy.

5. Conclusion and Prospect

Through in-depth research on innovation and entrepreneurship education in the cultural management majors of engineering advantage universities under the background of new liberal arts, the practical teaching model of "engineering empowerment and integration of cultural management" proposed in this article has achieved significant results in enhancing students' innovation ability, practical ability, and employment competitiveness. In the future, the project team will continue to deepen school enterprise cooperation, optimize the curriculum system and evaluation mechanism, promote the organic connection between the education chain, talent chain, and industry chain, and provide replicable and promotable successful examples for the construction of new liberal arts.

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3. Hubei University of Automotive Technology 2024 Annual Quality Enhancement Project for Graduate Education: Research on Improving the Quality of Management-Type Non-full-time Graduate Education at Local Institutions from the Perspective of Student Development (Y202410)

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5. Hubei University of Automotive Technology 2024 Annual Graduate Education Quality Project: Exploration and Practice of the "Five-Aspect-Integrated" Academic Atmosphere Construction System Based on the Growth Chain of Interdisciplinary Graduate Students (Y202415)

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