One Major, One Culture: Differentiated Practical Paths for Ideological and Political Education in Intelligent Manufacturing Courses at Local Universities

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Abstract: Breaking away from the rigid and superficial integration of ideological and political education in science and engineering courses, and transforming local excellent traditional cultural resources into professional educational resources is a key breakthrough for the construction of curriculum-based ideological and political education in local application-oriented universities. Based on the abundant local cultural resources in Yongzhou, the School of Intelligent Manufacturing of Hunan University of Science and Engineering has explored and established an integration model of "Major + Local Culture" featured as "One Major, One Culture". It integrates Emperor Shun's craftsman spirit, Liu Zongyuan's people-oriented ideology, red culture, Yao people's wisdom and Nüshu innovative spirit into the ideological and political construction of five majors respectively, namely mechanical engineering, intelligent manufacturing, electrical engineering, electronic information and electronic science and technology. Through drawing ideological and political element maps for courses, developing dual-driven cases integrating industry and ideological education, and building a matrix of practical platforms, it realizes the curriculum transformation and professional embedding of local culture. Practices have proved that this model effectively strengthens students' cultural identity and patriotism, and provides a replicable empirical paradigm for the characteristic construction of curriculum-based ideological and political education in local universities.

Keywords: Curriculum-based Ideological and Political Education; Local Culture; Intelligent Manufacturing; Major Integration; Cultural Education

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1.Research Background

With the further implementation of the Made in China 2025 strategy, the cultivation of intelligent manufacturing talents is confronted with new requirements of the times. Talents are expected to not only master sophisticated digital and intelligent technologies, but also possess the patriotism of serving the country through science and technology, the craftsman spirit of striving for perfection, and rigorous and pragmatic engineering ethics[1,2]. Nevertheless, curriculum-based ideological and political education in science and engineering disciplines is generally plagued by rigid and superficial integration, resulting in a prominent separation between ideological education and professional teaching[3,4]. How to integrate value cultivation into professional education in an organic way has become an urgent task for application-oriented universities.

Meanwhile, local universities are endowed with distinctive regional cultural resources. As a famous national

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Projects:

（1）2026 Hunan University of Science and Engineering "One College, One Brand" Brand Project for Curriculum Ideological and Political Education: Intelligent Manufacturing China · Inheritance of Craftsman Spirit — Three-dimensional Integration and Four-dimensional Linkage Ideological and Political Education System of the School of Intelligent Manufacturing, Project No.:Xiangke College Teaching Development Document No. 25(2026).

(2) 2026 Teaching Reform Research Project for Degree and Postgraduate Education of Hunan University of Science and Engineering: Research and Practice on Training Path of Outstanding Engineers Based on Industry-Education Integration under the "University-Industrial Park Symbiosis" Mode in Local Universities.

historical and cultural city, Yongzhou is home to the benevolent spirit embodied in Emperor Shun's virtue and filial piety culture, people-oriented sentiments reflected in Liu Zongyuan's philosophy of benefiting the people, feminine wisdom of Nüshu culture, perseverance embodied in Yao culture, as well as red spirits inherited from revolutionary martyrs including Li Da and Chen Shuxiang[5,6]. These precious resources provide abundant local materials for the development of curriculum ideological and political education. However, it remains a key problem to be solved urgently how to integrate such cultural resources into intelligent manufacturing education in a systematic, curriculum-oriented and professional manner, and avoid superficial and perfunctory combination.

Taking the School of Intelligent Manufacturing, Hunan University of Science and Engineering as a research case, this paper explores practical paths for in-depth integration of majors and local culture in curriculum ideological and political education, aiming to offer theoretical references and practical experience for the featured construction of such education in local universities.

2.Theoretical Logic: Internal Compatibility Between Local Culture and Curriculum-based Ideological and Political Education

2.1 Educational Value of Local Culture

As an indispensable part of fine traditional Chinese culture, local culture carries specific historical memories, values and spiritual temperament, and has inherent educational functions. Against the backdrop of building comprehensive ideological and political courses, local cultural resources provide vivid materials and immersive environments for ideological and political education in universities. Different from abstract theoretical indoctrination, local culture is embodied, situational and emotional, enabling students to internalize values while perceiving history.

From the perspective of cultural identity, integrating local cultural resources into professional education helps bridge the gap between local knowledge and universal knowledge. While intelligent manufacturing majors teach universal engineering and technical knowledge, local culture inherits regional values and wisdom. The in-depth combination of the two endows technical education with cultural warmth, offers a modern carrier for the inheritance of local culture, and achieves the dual goals of fostering competent professionals and cultural inheritors.

2.2 Internal Mechanism of Integrating Majors with Local Culture

The integration is not a simple cultural embellishment, but follows the underlying logic of curriculum ideological and political education. Firstly, ideological and political elements shall form internal connections rather than external grafting with professional knowledge. The embedding of local cultural spirits should be rooted in the core of professional knowledge, for instance, matching craftsman spirit with precision processing technology and people-oriented ideology with intelligent system design, so as to realize synchronous development of value guidance and technical teaching.

Secondly, local cultural resources need curriculum-based transformation. Scattered cultural materials cannot be directly applied in classroom teaching, and shall go through systematic transformation from cultural resources, teaching cases and course modules to educational systems, forming teachable, evaluable and replicable ideological and political educational resources.

Thirdly, differentiated positioning shall be highlighted in integration. Majors differ in knowledge systems, technical ethics and vocational scenarios, so a single local cultural resource cannot fit all majors. Accordingly, the corresponding mechanism of "One Major, One Culture" should be established to form differentiated embedding paths.

3.Practical Paths: Exploration of the "One Major, One Culture" Model in Hunan University of Science and Engineering

The School of Intelligent Manufacturing offers five undergraduate majors: Mechanical Design, Manufacturing and Automation, Intelligent Manufacturing Engineering, Electrical Engineering and Automation, Electronic

Information Engineering, and Electronic Science and Technology. Centering on local cultural resources in Yongzhou, the school has constructed a differentiated integration mode as follows:

Major	Corresponding Cultural Resources	Spiritual Core	Integration Orientation
Mechanical Design, Manufacturing and Automation	Emperor Shun's Craftsman Spirit	Striving for Perfection	Precision Manufacturing and Craft Inheritance
Intelligent Manufacturing Engineering	Liu Zongyuan's People-oriented Ideology	Benefiting the People	People-oriented Design of Intelligent Systems
Electrical Engineering and Automation	Li Da's Revolutionary Spirit & Red Culture	Serving the Country via Power Industry	Energy Security and National Responsibility
Electronic Information Engineering	Yao People's Wisdom	Perseverance and Innovation	Signal Processing and Communication Innovation
Electronic Science and Technology	Nüshu Culture	Wisdom and Innovation	Chip Design and Cultural Digitalization

3.1 Drawing Curriculum Ideological and Political Element Maps for Accurate Connection

To realize the precise docking between local culture and professional knowledge, core teachers of all majors sort out the knowledge point system of each course, and compile five-dimensional element maps covering knowledge points, Yongzhou cultural elements, ideological and political dimensions, integration methods and expected effects.

For mechanical majors, the craftsman spirit of pursuing perfection is combined with precision processing knowledge in Mechanical Manufacturing Technology courses. In Numerical Control Technology courses, comparisons between ancient craftsmanship and modern numerical control technology guide students to inherit craftsman spirits. For intelligent manufacturing majors, Liu Zongyuan's people-oriented thought is introduced in Intelligent Production Line Design courses to lead students to think about who technologies serve for from the perspective of engineering ethics.

The compilation process serves as in-depth teaching research. Each course holds no less than three special seminars to optimize the maps, turning empirical practice into standardized guidance and solving the fragmentation and randomness of ideological and political elements.

3.2 Developing Local Dual-driven Cases Combining Industry and Ideological Education

Relying on 46 practical local industrial research projects, the school develops teaching cases integrating industrial practice and ideological education, covering featured agriculture, cultural tourism and ecological protection in Yongzhou with inherent local service-oriented educational significance.

Typical cases include the intelligent planting and traceability system for Jiangyong ginger integrating science and technology assistance for agriculture with rural revitalization, digital protection of Li Da's former residence combining red culture inheritance with electronic information technology, and digital inheritance of Nüshu culture linking intangible cultural heritage protection with electronic science and technology.

All cases are standardized in five steps: case background, technical principles, ideological and political elements, teaching suggestions and discussion topics, turning the concept of serving local development into tangible practice and cultivating students' patriotism in solving practical local problems.

3.3 Building a Four-in-One Practical Education Platform

Curriculum ideological and political education extends beyond classroom teaching to practical sessions. The school has built a practical education chain integrating experiment, training, internship and voluntary service.

In experimental teaching, engineering ethics education such as safety norms and responsibility awareness is strengthened. In practical training sessions, the engineering training center focuses on cultivating craftsman spirits with comprehensive assessment on precision, efficiency and quality. In internships, practical education bases are co-built with leading enterprises to implement dual tutoring by enterprise mentors and professional teachers and cultivate professional ethics.

Notably, the school has carried out voluntary maintenance services for 41 consecutive years. The volunteer service team has provided free maintenance services for tens of thousands of residents since 1985, which has been reported by mainstream media and become a vivid mobile ideological and political course combining professional skills with social responsibility.

4.Practical Effects and Enlightenments

4.1 Practical Effects

After more than two years of practice, the model has achieved remarkable results. In terms of students, the satisfaction rate of curriculum ideological and political education exceeds 90%, and more graduates choose to stay and work in Yongzhou with the retention rate increased by over 10%. Many outstanding students have won national and provincial honors. In terms of teachers, four provincial outstanding teachers and one provincial exemplary ideological and political course have been cultivated, together with a batch of promotable teaching cases. All five majors have completed element map compilation, realizing the goal of embedding ideological and political education in all courses.

4.2 Practical Enlightenments

First, systematic curriculum-based transformation is essential to turn local cultural resources into educational resources. Complete procedures including resource sorting, element extraction, map drawing, case development and course embedding are required to implement cultural education effectively.

Second, differentiated integration shall be adhered to in major-culture combination to ensure targeted and effective ideological and political education.

Third, practical education is the core link of integration. Classroom teaching alone cannot realize in-depth value internalization, while practical activities including voluntary services, internships and scientific competitions help students understand cultural spirits and practice correct values through learning by doing.

5.Conclusion

The core innovation of the "One Major, One Culture" model lies in regarding local fine traditional cultural resources as transformable ideological and political educational assets rather than cultural heritages only for protection. It realizes in-depth integration between local cultural spirits and professional value education via standardized transformation paths, and offers an effective solution to eliminate the disconnection between professional teaching and ideological education in local application-oriented universities.

Further improvements still need to be made: expanding integration depth from course embedding to major construction optimization, improving the three-dimensional evaluation system covering process, result and long-term development, and strengthening university-local cooperation to expand the educational influence of the model to local industries and communities.

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