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Research on the Construction of the Ideological and Political System for Numerical Control Majors from the Perspective of Industry-education Integration: Practical Exploration Based on the Cultivation of the Craftsman Spirit

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Abstract: This article takes the construction of the ideological and political system for numerical control majors from the perspective of industry-education integration as the research object. Guided by the cultivation of students' craftsman spirit, it deeply explores how to flexibly infiltrate the craftsman spirit in the process of constructing the ideological and political system for numerical control majors. The aim is to further promote the Chinese national spirit represented by the craftsman spirit, cultivate more high-quality numerical control craftsmen to meet the needs of "Made in China 2025," and thus boost the connotative development of numerical control education.

Keywords: Industry-education integration; Numerical control major; Ideological and political education in courses; Craftsman spirit

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1. Introduction

The craftsman spirit refers specifically to craftsmen who have mastered skills proficiently and use them as a means of livelihood. Its core connotations are reflected in aspects such as striving for excellence, loving and respecting one's work, and perseverance. During the critical period of the transformation and upgrading of the manufacturing industry structure, the industry's demand for high-end precision manufacturing talents is becoming more and more urgent. Integrating the cultivation of the craftsman spirit into the ideological and political system of numerical control major courses is not only conducive to strengthening students' understanding and mastery of professional skills but, more importantly, helps to effectively solve the problem of the "two-piece-separation" of traditional professional education and ideological and political education, to better achieve the coordinated

development of knowledge imparting and value guidance. Research shows that industry-education integration and school-enterprise cooperation play a positive role in cultivating the craftsman spirit of numerical control major students and enhancing the effectiveness of ideological and political education in courses.

2. The contemporary significance of the craftsman spirit

For enterprises, the craftsman spirit is an important support for their survival and development. In recent years, the craftsman spirit has repeatedly appeared in the government work report, indicating its self-evident importance. The craftsman spirit is not only an intuitive manifestation of professional skills but also represents noble professional pursuits and lofty professional ethics [1]. In the 21st century, affected by many factors, the innovation paths of many enterprises are not smooth. Although some enterprises have achieved certain results in innovation, overall, their innovation capabilities still need to be improved. The fundamental reason lies in the enterprises' lack of attention to the craftsman spirit. Therefore, from the perspective of the long-term development of enterprises, the craftsman spirit is particularly important. For higher vocational colleges, the craftsman spirit is the key to cultivating students' professional qualities. As the main front for cultivating and exporting high-quality talents to society, higher vocational colleges should integrate the craftsman spirit into their education systems to enhance students' professional abilities and lay a solid foundation for their future development [2]. Therefore, higher vocational colleges should not only pay attention to theoretical teaching and skill imparting but also strengthen the cultivation of students' professional spirits. Only in this way can students be gradually developed into compound talents with synchronized development of abilities and qualities, and can the needs of industry and social development in the new era be further met.

3. The value connotations of constructing the ideological and political system for numerical control majors from the perspective of industry-education integration

3.1. Contributing to the implementation of the fundamental task of fostering morality and cultivating people

All along, the implementation of ideological and political education has mainly relied on traditional ideological and political theory courses. Since their teaching practices are not closely combined with social practices and do not fully reflect professional characteristics, the effects of ideological and political education have not been satisfactory. As one of the majors with significant practical characteristics, the numerical control major's construction of an ideological and political system for courses from the perspective of industry-education integration is conducive to effectively making up for the deficiencies of traditional ideological and political education, expanding the channels of ideological and political education, and greatly enhancing the effectiveness of ideological and political education. Specifically, teachers of the numerical control major, together with enterprise mentors, are committed to integrating diverse ideological and political elements into all aspects of curriculum teaching. In this way, it not only helps students deepen their understanding of the numerical control industry and related positions but also subtly cultivates students' professional qualities and craftsman spirit, thus providing strong support and guarantee for the implementation of the fundamental educational task of fostering morality and cultivating people [3,4]. Moreover, teachers can take professional ethics as a starting point, closely combine it with textbook content, and aim to meet industry needs to guide students to fully understand the positive role of professional ethics, such as hard work, striving for excellence, and being diligent in research

in their future career development. Truly integrating the construction of the ideological and political system for numerical control major courses with students' personal growth and development is conducive to inspiring students to actively practice ideological and political content in future job practices, which is of far-reaching significance for students' long-term development.

3.2. Contributing to the improvement of the teaching quality of numerical control major courses

Industry-education integration requires that the teaching of numerical control major courses should not focus solely on theoretical knowledge imparting, but should closely combine theory with practice. By actively introducing on-campus training and enterprise internships, students are guided to continuously exercise their skills through practice, significantly enhancing their job competitiveness. In addition, industry-education integration requires that students should not rely solely on teacher guidance but should give full play to their subjective initiative, actively explore the mysteries of the industry, and study professional skills. In the process of continuous training, students can develop abilities such as independent exploration and teamwork and possess excellent qualities such as striving for excellence and being meticulous. In this context, the evaluation of the teaching quality of numerical control major courses is not limited to students' theoretical test scores or professional skill application levels but focuses more on the evaluation of students' ideological and moral qualities. Therefore, the numerical control major should build a complete ideological and political system for courses and flexibly integrate ideological and political elements into the teaching process of professional courses to meet the diversified needs of the industry for talents, thus promoting the upgrading and development of the industry [5,6].

4. Effective strategies for forging numerical control craftsmen and constructing the ideological and political system for courses from the perspective of industry-education integration

4.1. Constructing a flexible curriculum system adapted to intelligent manufacturing

As an effective carrier and strong support for implementing ideological and political education in numerical control major courses and cultivating students' craftsman spirit, the curriculum system should be closely connected to industry development and actual job requirements. By constructing a flexible curriculum system adapted to intelligent manufacturing, the most cutting-edge theoretical knowledge and professional skills can be taught to students. At the same time, favorable conditions are created for the integration of ideological and political elements, and students' craftsman spirit can be cultivated imperceptibly, enabling students to master "unique skills." Nowadays, technologies such as precision manufacturing, special processes, and material processing involved in high-end manufacturing all fall within the scope of numerical control technology. Especially in the fields of intelligent manufacturing of aerospace precision parts and precision mold processing, there is an urgent demand for high-end numerical control talents [7]. In response to specific demands and based on the training goal of high-quality numerical control professionals, schools should actively construct a targeted curriculum system covering basic skills, professional skills, basic technologies, and professional technologies to build a hierarchical, flexible, diversified, and dynamic curriculum structure. It is hoped that through diversified courses, students can be cultivated with an attitude of striving for excellence, perseverance, and innovative thinking, and the goal of closely integrating ideological and political education with professional education can

be achieved [8]. Specifically, in order to accurately meet the needs of the aerospace precision parts manufacturing field, the numerical control major is committed to building an intelligent manufacturing curriculum and training center and has successively opened courses such as "Numerical Control Processing Technology for Complex Parts", "UG Multi-Axis Machining Programming", and "Maintenance and Repair of High-End CNC Machine Tools". In order to keep up with the trends of intelligent manufacturing and the big data era, courses in directions such as "Industrial Robot Application", "Intelligent Logistics Management," and "Big Data" have been added [9]. Moreover, schools should rely on the "government-industry-enterprise-school" industry-education-research alliance, deepen school-enterprise cooperation, and build a "3D Printing Innovation Center," a "Precision Detection Innovation Laboratory," etc. In this way, the deep integration of industry, education, and research can be further promoted, and more high-end numerical control talents with innovative spirits and craftsman qualities can be cultivated, thus boosting the leapfrog development of the numerical control industry.

4.2. Promoting the reform of the blended teaching model and the practice of the "Modern Apprenticeship System"

As a new direction for the teaching reform of numerical control majors, the blended teaching model aims to greatly enhance the flexibility of teaching and learning through the close combination of traditional teaching and online learning, providing a diversified interactive platform for the infiltration of ideological and political education. From the perspective of industry-education integration for the numerical control major, in order to significantly enhance the effectiveness of cultivating the craftsman spirit, schools should actively build an "Internet + Intelligent Manufacturing" industry-education integration adaptive learning system platform. As a bridge, this platform provides a convenient channel for resource sharing and demand docking among schools, enterprises, and industries. At the same time, it provides students with an open and flexible learning and practice environment, allowing students to fully immerse themselves in a real-combat environment to train their skills and improve their qualities, and unconsciously internalize and externalize the craftsman spirit. The adaptive learning system platform can provide high-quality services for students' learning and practice. It not only covers functions such as virtual enterprise training, skill training, and employment promotion but also helps students with pre-class independent preview and post-class consolidation and improvement. By forming a complete learning loop, the learning and training effects can be greatly improved. However, the cultivation of the craftsman spirit cannot be achieved overnight; it requires long-term accumulation and perseverance [10].

Research shows that to build a systematic and complete ideological and political system for courses and cultivate more outstanding numerical control craftsmen, relying solely on on-campus learning and practice is far from enough. Instead, long-term edification of corporate culture and the words and deeds of predecessors are needed. Only in this way can students deeply understand the connotation of the craftsman spirit and be willing to be influenced by ideological and political elements. Therefore, schools should actively introduce the new talent-training model of the "modern apprenticeship system." By establishing "numerical control master" studios and implementing the "famous teacher-outstanding apprentice" project, technical experts, master craftsmen, model workers, and advanced representatives are invited to guide students and form pairs, promoting the inheritance and innovation of technologies such as precision manufacturing and special processing. In this process, students can not only receive the personal guidance of masters but also learn their excellent qualities and lofty spirits through daily influence. Gradually, craftsman qualities such as striving for excellence, concentration, and perseverance are deeply rooted in students' hearts, and they grow into numerical control craftsmen with excellent skills and high qualities from the inside out [11].

4.3. Constructing a case database conducive to telling the stories of the craftsman spirit

From the perspective of industry-education integration, in addition to focusing on the imparting of theoretical knowledge, the construction of the ideological and political system for numerical control major courses should also focus on sharing excellent craftsman cases and actively encourage students to practice. Only in this way can the charm of craftsman stories be demonstrated, and the effect of promoting learning through cases and promoting practice through learning can be achieved. Therefore, the premise of constructing the ideological and political system for numerical control major courses is that teachers should widely collect and organize excellent craftsman spirit stories in the industry, deeply explore the ideological and political elements hidden behind different stories, and then integrate them with professional teaching content to finally form a vivid case database to influence students' thoughts and fully mobilize their learning enthusiasm. The craftsman spirit case database should comprehensively reflect the core connotation of the craftsman spirit and demonstrate its positive role in social development and national progress [12]. Teachers can use various methods, such as online inquiries and field investigations to widely collect and organize case materials in different forms, such as pictures, videos, and texts. They can also conduct on-site investigations in enterprises, deeply understand the mental journeys and real thoughts of craftsmen through face-to-face interviews, and finally refine and integrate them to construct a vivid case database, providing rich materials for the integration of ideological and political education into numerical control professional education in the future. When designing teaching activities, teachers of the numerical control major should naturally integrate the craftsman spirit into the emotional education goals. Then, through means such as role-playing and case simulation, students are guided to experience each vivid craftsman story and deeply understand its charm, thus laying a solid ideological foundation for their future careers [13].

4.4. Establishing a mixed "craftsman-teacher" team with an international perspective

"Craftsman-teachers" are the foundation and key to cultivating high-quality numerical control craftsmen. They are not only the transmitters of skills but also the leaders of spirits. In order to comprehensively improve students' numerical control skills and better inherit and promote the craftsman spirit, schools should strive to build a mixed "craftsman-teacher" team with an international perspective and excellent skills, setting a benchmark of striving for excellence for students, so that they can be influenced and inspired by "craftsman-teachers" both visibly and invisibly, thus promoting the all-round development of students [14]. Specifically, schools should establish a strict selection mechanism, select a group of outstanding backbone teachers, and regularly organize them to study and research in well-known domestic and foreign enterprises, providing teachers with sufficient opportunities to access cutting-edge numerical control knowledge and technologies, broadening teachers' horizons, and continuously improving their professional qualities. Moreover, schools should actively recruit senior engineers from enterprises to supplement the existing teaching team and further build a "craftsman-teacher" team to bring the most cutting-edge knowledge and technologies to students [15]. In addition, relying on school-enterprise cooperation, schools should jointly provide modular and hierarchical vocational training for teachers with enterprises. The training covers many fields, such as ideological and political education in courses, intelligent manufacturing, and cutting-edge technologies, to ensure that teachers can bring advanced concepts and technologies into the classroom. Schools can also actively encourage teachers to conduct practical training in enterprises, enabling them to grow into not only professional teachers but also excellent professionals, thus providing strong support and guarantee for the cultivation of more numerically controlled craftsmen.

5. Conclusion

At present, cultivating students' correct values, outlooks on life, and worldviews has become the main goal of the numerical control major in building the ideological and political system for courses. From the perspective of industry-education integration, teachers should closely combine the teaching content of the numerical control major, aim to promote the construction of ideological and political education in professional courses, and take the cultivation of students' craftsman spirit as a starting point. By taking multiple measures, the numerical control professional education and ideological and political education should be truly integrated to lay a solid foundation for the comprehensive development of students.

Disclosure statement

The authors declare no conflict of interest.

References

[1] Yao X, 2024, Research on the Construction Strategies of Ideological and Political Education in Numerical Control Technology Application Major Courses under the Background of Industry-education Integration. Teacher, 2024(28): 18–20.

[2] Jian X, 2025, Research on the Curriculum Reform and Practice of Secondary Vocational Numerical Control Majors under the Background of Ideological and Political Education in Courses. Guangdong Education, 2025(3): 72–74.

[3] Wei L, Gao Q, 2024, Research and Practice on the Ideological and Political Teaching of the "Numerical Control Multi-axis Machining Technology" Course. Big Science, 2024(48): 43–45.

[4] Wang X, Zhang P, 2021, Exploration and Practice of Ideological and Political Education in Engineering Training. Education Modernization, 2021(73): 194–196.

[5] Dong X, 2018, Construction of the Curriculum System for Numerical Control Technology Majors under the Guidance of the Craftsman Spirit: Taking the Numerical Control Technology Major of Suzhou Vocational University as an Example. Journal of Suzhou Vocational University, 29(4): 60–62.

[6] Zhao C, 2019, Discussion on the Reform of Cultivating Craftsmen in Numerical Control Technology Majors in the New Era. Modern Vocational Education, 2019(13): 238–239.

[7] Li J, 2021, Application of the "Craftsman Spirit" in the Teaching of the NC Milling Training Link in Higher Vocational Education. Hubei Agricultural Mechanization, 2021(3): 81–82.

[8] Liu Y, 2017, Cultivating Modern Craftsmen through Industry-education Integration and School-enterprise Cooperation. China Bicycle, 2017(1): 52–53.

[9] Yin G, Peng J, 2020, Research on the Cultivation of Numerical Control Technology Craftsmen with Industry-education Integration as the Core. Technology Wind, 2020(18): 284.

[10] Dong X, 2018, Research on the Cultivation of Numerical Control Technology Craftsmen with Industry-education Integration as the Core. New Curriculum Research (Mid-bimonthly), 2018(3): 131–134.

[11] Li W, 2019, Research on the Cultivation of Numerical Control Technology Craftsmen with Industry-education Integration as the Core. Shantianxia, 2019(24): 136.

[12] Lu J, 2019, Innovative Research on the Cultivation of Numerical Control Technology Talents with "In-depth School-enterprise Cooperation and Integrated Industry-education". Occupation, 2019(29): 34–35.

[13] Xu H, 2018, Research on the Training Model of Higher Vocational Numerical Control Talents Based on "School-

Enterprise Cooperation and Industry-education Integration". Vocational Technology, 17(5): 13–15.

[14] Wang X, 2017, Analysis of the Integration of Practical Teaching of Secondary Vocational Numerical Control Majors and the Craftsman Spirit. Examination Weekly, 2017(67): 70.

[15] Men C, 2019, Strengthening Engineering Education in Numerical Control Technology and Cultivating Students' Spirit of Craftsmanship. Hebei Farm Machinery, 2019(3): 74–75.