Research on the Teaching Reform of Curriculum Ideological and Political Education in Higher Vocational Colleges from the Perspective of Industry-Education Integration and Digital Empowerment

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Abstract: Against the background of the digitalization of higher education, digitalization has become an effective measure for the construction of curriculum ideological and political education in colleges and universities. Teaching practice has shown that industry-education integration is an important approach and means for the "three teaching reforms" in higher vocational colleges, as well as a prominent feature and important guiding principle for carrying out the reform and innovation of curriculum, ideological and political teaching in these colleges. From the perspective of in-depth industry-education integration, the curriculum ideological and political teaching in higher vocational colleges faces problems such as the localization of communication mechanisms among curriculum ideological and political education subjects, the fragmentation of local educational resource excavation, and the one-sidedness of curriculum ideological and political teaching evaluation. Therefore, based on the background of the digital era, this paper explores three major paths of digital empowerment for curriculum ideological and political education in higher vocational colleges: the school-enterprise dual-member collaboration of subjects, the co-construction and sharing of school-enterprise curriculum ideological and political teaching resources, and the scientific and intelligent two-way teaching evaluation between schools and enterprises, aiming to promote the curriculum teaching reform in higher vocational colleges from the perspective of in-depth industry-education integration.

Keywords: Industry-education integration; Digitalization; Higher vocational colleges; Curriculum ideological and political education; Teaching reform

1. Dilemmas of the teaching reform of curriculum, ideological and political education in higher vocational colleges from the perspective of industry-education integration

1.1. The communication mechanism among curriculum, ideological and political teaching subjects is relatively localized

Although schools and industry enterprises have formed various cooperation models, such as vocational education groups, on-campus and off-campus practical teaching bases, and industry-education integration communities through long-term cooperation, their functions have not been fully activated and effectively transformed in the process of curriculum ideological and political teaching reform [1]. Most cooperations still focus on practical aspects such as professional curriculum settings, training condition construction, and employment connection, lacking systematic design and institutional arrangements for the integration of ideological and political education elements. Schools and enterprises rarely conduct in-depth dialogues on the goal positioning, content connection, and implementation paths of curriculum ideological and political education in cooperation, resulting in the difficulty of truly embedding ideological and political education into the entire process of industry-education collaborative talent training.

As an important carrier for integrating regional educational resources, vocational education groups should have become key hubs for promoting the sharing of curriculum ideological and political resources and the common understanding of concepts. However, in actual operation, their management structure is mostly administrative-led, and enterprise participation mostly stays at the level of signing agreements or project naming, lacking regular communication channels and division of responsibilities mechanisms [2]. Although off-campus practical teaching bases provide students with real work scenarios, enterprise tutors generally lack an understanding of the connotation of ideological and political education, focusing more on operational norms and professional discipline during guidance, while neglecting value guidance and social responsibility cultivation. The absence of an inter-subject communication mechanism makes it difficult for curriculum ideological and political education to achieve cross-domain collaboration and resonance, restricting the comprehensive achievement of the goal of cultivating high-quality technical and skilled talents.

1.2. The excavation of local educational resources for curriculum ideological and political content is relatively fragmented

The selection of curriculum ideological and political content mostly relies on the individual experience, judgment and subjective preferences of teachers, lacking unified planning and top-level design. Teaching materials are scattered in sources and unfocused in themes, making it difficult to form a coherent value guidance context. Although some teachers attempt to introduce local culture, industry models, or regional development cases in teaching design, these elements are mostly embedded in classrooms as decorative content, failing to organically connect with the professional knowledge system [3].

Due to the lack of a long-term operation mechanism and systematic design, local educational resources have not been truly transformed into a stable teaching support force. Most higher vocational colleges have not incorporated the development of localized resources into the revision of curriculum standards, the construction of teaching teams, or the teaching quality evaluation system, resulting in this work being marginalized and difficult to obtain continuous investment and policy inclination. Teachers lack professional guidance and technical support in the process of resource collection, content transformation, and teaching application, which further exacerbates the randomness and unsustainability of the work [4]. Higher vocational colleges have not yet established a

collaborative education environment driven by local resources as the core, leading to an insufficient connection between ideological and political education and students' growth environment, a weak education atmosphere, and affecting the effectiveness and appeal of value shaping.

1.3. The curriculum ideological and political teaching evaluation system is relatively one-sided

The existing evaluation mechanism mostly focuses on assessing teachers' "teaching" level, focusing on links such as lesson plan design, classroom teaching, and teaching organization, and emphasizing whether teachers integrate ideological and political elements into professional curriculum content. However, in the dimension of students' "learning," the evaluation is obviously weak, failing to fully reflect students' ideological changes, value recognition, and behavioral performance after receiving curriculum ideological and political education [5]. As the core subject of the education process, students' learning experience, emotional resonance, value internalization, and daily behavior transformation have not been systematically included in the evaluation scope, and the evaluation results are difficult to truly reflect the actual effect of curriculum ideological and political education.

From the perspective of evaluation methods, the current general practice is to carry out summative evaluation in the form of final questionnaires, phased tests, or course completion reports, emphasizing result output rather than the growth process [6]. Evaluation standards tend to be unified, rarely considering the diversity of students' acceptance of ideological and political education with different professional backgrounds, individual differences, and development stages, which inhibits the space for personalized development. The application of formative evaluation tools is limited, and a comprehensive evaluation model based on multi-source data, such as daily classroom interaction, social practice participation, and team collaboration performance, has not been established. Furthermore, the concept of value-added evaluation has not been implemented, making it difficult to measure the progress of students before and after receiving curriculum ideological and political education. The application of digital technology is still in its initial stage, lacking a precise, dynamic, and visual evaluation support system relying on big data analysis, learning behavior modeling, intelligent feedback systems, etc., which limits the scientificity and effectiveness of evaluation [7].

2. Paths of digital empowerment for the teaching reform of curriculum, ideological and political education in higher vocational colleges from the perspective of industry-education integration

2.1. Digital empowerment for the school-enterprise dual-member collaboration of curriculum ideological and political subjects in higher vocational colleges

Digital technology is deeply embedded in the construction of curriculum, ideological and political teaching subjects in higher vocational colleges. By introducing a talent training program management platform, schools and enterprises can align goals at the initial stage of curriculum design and jointly formulate a teaching goal system that meets industrial needs and ideological and political education orientation [8]. The platform supports online collaborative revision of training programs by both parties, ensuring the organic integration of curriculum, ideological and political elements into professional courses, and avoiding the problems of lagging school-enterprise connection or information asymmetry in traditional models. The curriculum, ideological and political teacher management and training platform provides a unified qualification review, competence evaluation, and continuous development channel for on-campus and off-campus teachers. Enterprise technical personnel can be

included in the part-time teacher team through a certification mechanism, and complete pre-service training on teaching norms, ideological security, etc., on the platform to improve their ability and sense of responsibility in carrying out curriculum ideological and political education.

The phased teaching management platform divides the entire teaching process into several phase nodes, supporting the closed-loop operation of "introduction—implementation—feedback—optimization." Each phase sets clear ideological and political teaching tasks and observation indicators. On-campus teachers are responsible for theoretical teaching and value guidance, while enterprise teachers conduct situational teaching combined with on-the-job practical cases. Both parties record teaching behaviors, upload teaching resources, and track students' growth trajectories on the platform [9]. Students' learning data, participation, value performance, and other information are transmitted back to the platform in real time to form dynamic portraits for analysis by both schools and enterprises. The data flow between multiple subjects continuously circulates among "on-campus teachers—enterprise teachers—enterprises—schools—platform—students", breaking the fragmented state of subjects in traditional teaching and realizing the whole-process and full-chain collaborative linkage.

At the management level, the teaching behavior logs, interaction frequency, resource utilization rate, student satisfaction, and other data collected by the platform are used to dynamically monitor the quality of school-enterprise collaboration. The system can automatically identify weak links in cooperation and issue early warnings to help school administrative departments formulate precise policies. On-campus managers can grasp the overall operation situation through a visual dashboard, and enterprise managers can also timely understand the performance of employees participating in teaching. The built-in messaging system, meeting booking module, and collaborative editing function of the platform provide a stable and efficient communication environment for on-campus and off-campus teachers, supporting the regular development of cross-organizational teaching and research activities [10].

2.2. Digital empowerment for the co-construction and sharing of school-enterprise curriculum ideological and political teaching resources

Using big data analysis and cloud computing technology, the form of teaching resources is no longer limited to traditional text handouts or PPT presentations, but expands to multimedia and interactive content [11]. Various elements such as images, audio, 3D models, and timeline demonstrations are embedded in curriculum design, transforming abstract ideological and political concepts into perceptible and interactive learning experiences, and realizing the visualization and three-dimensional presentation of teaching content. Students understand core values such as professional ethics, craftsman spirit, and social responsibility in an immersive digital environment, enhancing emotional resonance and cognitive internalization.

The application of video and animation resources in curriculum ideological and political teaching has effectively improved the situational sense and attractiveness of teaching. Real enterprise work scenarios can be restored through high-definition documentary short films, showing the value choices of front-line employees when facing professional challenges [12]; typical character deeds are presented in the form of micro-documentaries to strengthen the role model leading effect. Animations are used to simulate complex ethical situations, such as the responsibility tracing of safety production accidents and the integrity choices in business decisions, helping students conduct moral judgment and behavioral reflection in virtual situations. These resources are jointly planned for scripts, provided with materials, and reviewed for content by both schools and enterprises to ensure that they not only conform to the laws of education and teaching but also are close to actual industrial needs.

Artificial intelligence and virtual reality technologies have further deepened the development and sharing

mechanism of local educational resources. The AI-driven intelligent recommendation system can accurately push highly matched case resources according to students' professional backgrounds, learning trajectories, and value tendencies, improving the effect of personalized education. Chatbots based on natural language processing can provide ideological and political Q&A services after class, extending the time and space of education. VR technology is used to reconstruct local red cultural sites, intangible cultural heritage inheritance workshops, or historical and cultural exhibition halls of key enterprises. Teachers and students can carry out "cloud visits" and "cloud research" through virtual roaming, intuitively feeling the regional development context and industrial spiritual connotation [13]. All resources are uploaded to a cloud database co-managed by schools and enterprises after standardized coding, realizing open access and continuous iteration across campuses and enterprises, and truly achieving the co-construction, sharing, and win-win of high-quality ideological and political education resources.

2.3. Digital empowerment for the scientific and intelligent two-way teaching evaluation of curriculum, ideological and political education between schools and enterprises

Relying on big data platforms and cloud computing systems, behavioral data, interaction records, assessment results, and other information in the teaching process can be collected and updated in real time. Enterprise tutors and school teachers can continuously observe and provide feedback on students' ideological and political dimensions, such as value cognition, professional quality, and social responsibility at different time nodes through a unified digital evaluation system. The online evaluation module is embedded in the daily teaching process, integrating phased evaluation, project-based assessment, and process observation to form a closed-loop management throughout the teaching cycle [14]. Enterprise participation in evaluation is no longer limited to a single score at the end of the internship, but through a digital dashboard to real-time view students' non-cognitive ability performance such as team collaboration awareness and craftsman spirit practice in curriculum tasks, realizing the synchronous linkage between schools and enterprises in monitoring education effectiveness.

The intelligent architecture of the evaluation system supports schools and enterprises to set differentiated evaluation models according to actual needs, promoting the personalized development of curriculum, ideological, and political evaluation. Artificial intelligence algorithms can automatically match the corresponding weight of ideological and political literacy indicators according to the talent training goals of different professional groups. For example, engineering majors focus on the quantitative analysis of professional ethics and safety norms, while service majors strengthen the behavioral identification of integrity awareness and humanistic care. Learning analysis technology generates personalized ideological and political literacy growth portraits by clustering multi-modal data of students in scenarios such as virtual simulation, online discussions, and case studies [15]. Enterprises can customize evaluation parameters on the platform according to the post-competency model, integrating the unique value requirements of the industry into the scoring system. Both school and enterprise subjects can intuitively grasp the value development trajectory of each student through visual reports, and achieve precise education through collaborative intervention.

3. Conclusion

To implement the fundamental purpose of fostering virtue through education and realize the transformation from "ideological and political courses" to "curriculum ideological and political education," the core lies in reflecting the typical characteristics of vocational education and realizing the collaborative education of ideological and

political courses and curriculum ideological and political education. Therefore, as a prominent feature of the type characteristics of education, industry-education integration is not only an important guiding principle for the reform and innovation of curriculum ideological and political teaching in higher vocational colleges, but also an essential magic weapon for promoting the reform and innovation of curriculum ideological and political teaching. In the era of digital education, how to use digital means such as computer technology and network communication technology to break the obstacles of curriculum ideological and political teaching and education caused by space and time, organically integrate higher vocational colleges and industry enterprises, the two major subjects of curriculum ideological and political teaching, and provide strong technical support for the reform and innovation of curriculum ideological and political teaching from the perspective of industry-education integration, is a new research direction that must be innovated and broken through under the background of the vigorous development of curriculum ideological and political education and the construction of a digital China.

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