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Innovative Teaching Model of Curriculum Ideological and Political Education in Internet of Things Courses in Private Universities

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Abstract: The rapid development of Internet of Things (IoT) technology has put forward an urgent demand for the knowledge, skills, and literacy of related talents. Against this background, curriculum ideological and political education, as an important way to cultivate IoT talents with both virtue and ability, has increasingly gained attention. Promoting the construction of curriculum ideological and political education in IoT courses in private universities can not only give full play to the unique educational role of each IoT course but also promote the in-depth integration of professional education and ideological and political education, thereby achieving the goal of organic unity of knowledge impartment, ability training, and value shaping. Focusing on IoT courses in private universities, combined with student characteristics and professional positioning, this paper first briefly expounds the necessity and challenges of the innovative teaching model of curriculum ideological and political education in IoT courses. On this basis, it summarizes and proposes effective strategies for the innovation of the teaching model, hoping to provide theoretical reference and practical paradigm for other related engineering majors in private universities to naturally and effectively promote the construction of curriculum ideological and political education, and ultimately cultivate more and more outstanding IoT talents who integrate knowledge and practice.

Keywords: Private universities; Internet of Things; Curriculum, ideological and political education; Teaching model; Innovative strategies

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1. Introduction

As an important part of the new generation of information technology industry, the Internet of Things is invisibly changing the ways of social production and life. Private universities assume the important mission of cultivating applied and skilled talents. For IoT courses, they are the main position for cultivating senior engineering and technical talents who firmly grasp the relevant theories, methods, and skills of the Internet of Things. To flexibly respond to a series of challenges brought by the new round of technological revolution and industrial upgrading,

private universities should attach importance to the cultivation of high-quality IoT talents with both professional knowledge and social responsibility, and especially increase efforts in teaching reform. Thus, the organic integration of curriculum, ideological and political education into IoT courses in private universities is a powerful measure to promote the innovation of teaching models and an inevitable path to meet the social demand for cultivating high-quality compound IoT talents.

2. Necessity and practical challenges of the innovative teaching model of curriculum ideological and political education in IoT courses in private universities

2.1. Necessity

The IoT discipline has obvious technology-intensive and interdisciplinary characteristics, and its knowledge system involves multiple fields such as perception, networking, computing, and decision-making. The development of these fields has put forward higher requirements and formulated dual standards for talents: on the one hand, requiring practitioners to have excellent engineering practice and innovation capabilities; on the other hand, requiring practitioners to consciously assume social responsibility and have good professional ethics. However, the current IoT teaching in many private universities has the problem of "valuing technology over literacy". In other words, most IoT courses focus on knowledge teaching and technology implementation, while neglecting the cultivation of students' social responsibility, which may lead them to have a superficial understanding of technology and be unable to deeply understand the profound impact of technology on social development [1]. Based on this, integrating curriculum ideological and political education into all links of IoT teaching can not only consolidate students' professional skills but also guide them to consciously assume social responsibility and cultivate good moral awareness, ultimately realizing the coordinated development of knowledge implementation and value guidance. More importantly, with the continuous expansion of IoT application fields, a series of related problems have emerged, such as privacy leakage and security vulnerabilities, which invisibly affect public security. However, if teachers consciously guide students to face these problems and encourage them to discuss hot issues, students can take the initiative to think about a series of practical ethical issues, such as how to design perception systems that protect user privacy and how to ensure the security and reliability of IoT platforms [2]. Such teaching models can not only help students establish correct technical values but also guide them to deeply think about the close connection between technology and ethics, so that they can consciously practice positive and healthy technological development concepts in future professional practice and promote the all-round development of students.

2.2. Practical challenges

As we all know, the teaching content of IoT courses involves a large number of professional terms and technical principles. At the same time, the courses also emphasize engineering practice and application innovation, which invisibly increases the difficulty of integrating ideological and political education. How to naturally and effectively integrate ideological and political elements into highly technical content has become a major problem in IoT teaching reform. Essentially, ideological and political education focuses on value guidance and ideological enlightenment, and its content is both theoretical and abstract. In contrast, IoT courses emphasize specific technical implementation and practical operations. Due to the obvious differences in teaching logic and discourse system between the two, the in-depth integration of ideological and political education and IoT courses places higher requirements on teachers' interdisciplinary teaching capabilities. In addition, it requires

teachers to have excellent curriculum design capabilities and invisibly calls for the systematic reconstruction of teaching content and curriculum activities. Only in this way can a teaching system unifying value guidance and technology implementation be constructed [3]. In addition, the integration of ideological and political education into IoT courses also brings new challenges to the reform of teaching methods and teaching evaluation, such as how to promote the integration of the two through innovative teaching methods, how to guide students to deeply think about the moral ethics and social responsibility hidden behind IoT technology through case analysis and social practice, and how to examine the teaching effect of curriculum ideological and political education in IoT courses through building a diversified and dynamic evaluation system. Solving the above problems is urgent and necessary.

3. Effective strategies for the innovation of the teaching model of curriculum ideological and political education in IoT courses in private universities

3.1. Establish a trinity teaching goal

The "trinity" specifically refers to the organic combination and coordinated development of knowledge, skills, and literacy. Teachers should combine the training direction of applied and compound IoT talents in private universities, take into account the value attribute of ideological and political education and the technical attribute of IoT courses, and establish a trinity teaching goal of "knowledge impartment + ability training + value guidance", aiming to provide solid support and guarantee for the penetration of ideological and political education into professional education. First, regarding knowledge impartation, teachers should systematically teach students the core knowledge points related to the Internet of Things, consolidate their professional foundation, and help students build a knowledge system that keeps up with industry development, to lay a solid foundation for their future career development. Second, regarding ability training, teachers should focus on cultivating students' engineering practice ability, innovation and R&D ability, teamwork ability, problem-solving ability, etc., relying on carriers such as school-enterprise cooperation and project-based learning, and guide them to apply the learned knowledge to practice on time to fully prepare for future post-practice. Finally, regarding value guidance, teachers should integrate ideological and political elements such as dedication, craftsmanship spirit, network security awareness, and scientific and technological ethics into the formulation of literacy goals in combination with the development needs of the IoT industry and students' personal career development plans, guide students to gradually establish a firm belief in serving the motherland with science and technology and realizing personal value, and at the same time cultivate their good professional ethics, such as rigor, pragmatism, and pursuit of excellence, which is also crucial for students' all-round development [4,5]. Taking the course "Sensor Network Application Development" as an example, teachers can lead the construction of curriculum ideological and political education by fostering the feelings of serving the country through science and technology as the main line.

3.2. Dig deep into and integrate ideological and political education elements

IoT courses cover multiple teaching modules, such as sensor technology, communication protocols, and data analysis, and each module contains different ideological and political education elements. This requires teachers to have the ability to accurately excavate and flexibly integrate ideological and political elements. Taking the teaching of content related to "sensor technology principles and applications" as an example, teachers can integrate the concept of environmental protection and sustainable development into teaching. By guiding students

to actively think about the value and approaches of advanced perception technology applied in environmental pollution monitoring and resource optimization and utilization, help them deeply understand the connotation and value of science and technology serving ecological civilization construction [6]. For another example, to cultivate more modern scientific and technological talents who take the initiative to assume social responsibility, consciously abide by laws, and adhere to moral bottom lines, teachers can integrate content such as information security laws and regulations and network ethics into the teaching of "data security and privacy protection". Before the official start of teaching, teachers should accurately locate the ideological and political entry points of different knowledge points, so as to promote the in-depth integration of professional knowledge and ideological and political elements, and invisibly cultivate students' correct values, outlook on life, and world outlook [7].

In addition to digging deep into the rich ideological and political resources contained in IoT courses, teachers should also pay attention to the modular design of ideological and political education content to ensure its organic connection with each technical teaching unit. Taking the "IoT security" module as an example, teachers can add special topics similar to "network security and national strategic security" to guide students to deeply think about and actively explore the close connection between technological development and national security. For example, teachers can integrate cases such as "smart cities and refined social governance" into the teaching of the "IoT applications" module and guide students to discuss how IoT technology helps social development [8]. Such a modular teaching design is not only clear in structure but also highly targeted, which can carry out systematic and targeted ideological and political education while completely imparting professional knowledge, and ultimately promote the coordinated development of knowledge impartation and value guidance.

3.3. Innovate ideological and political integration teaching methods

Students in private universities are active in thinking and have a clear practical orientation. Combining student characteristics, teachers can actively introduce diversified teaching methods, such as case analysis, project-driven, scenario simulation, and role-playing, which can not only ensure the integration effect of ideological and political elements but also fully mobilize students' enthusiasm and initiative in participating in classes, achieving a multiplier effect in teaching.

For example, teachers can intuitively present real IoT application scenarios such as smart medical care and intelligent transportation to students and guide them to analyze cases from multiple perspectives, so as to make them deeply think about issues such as technical implementation, ethical constraints, and social responsibility involved in the cases, and cultivate students' sense of social responsibility. Taking cases related to "smart medical care" as an example, teachers can put forward the question "How to balance the protection of patients' data privacy and the improvement of diagnosis and treatment efficiency?" to guide students to think, to help them establish scientific and responsible technical ethics concepts, make them understand that technical applications should strictly abide by system norms, and at the same time appropriately take into account humanistic care [9]. In addition, to cultivate students' teamwork spirit, teachers can actively introduce project-driven teaching methods. For example, teachers can carefully design practical projects closely linked to social responsibility in combination with teaching content, such as "design of community intelligent garbage classification monitoring system" or "smart home solutions with privacy protection mechanisms", aiming to let students engage in practice while targeting the training of professional skills such as system design, development, and debugging. At the same time, guide them to personally experience the social value and ethical responsibility carried by technology in the process of solving practical problems, and ultimately cultivate their sense of responsibility and mission to benefit society with technology [10].

3.4. Construct a diversified and comprehensive evaluation system

Previous evaluations were limited to knowledge assessment, which was difficult to fully reflect the comprehensive development of students in terms of knowledge, ability, and literacy. To this end, teachers can construct a diversified and comprehensive evaluation system from the following two aspects to achieve a multi-dimensional assessment of teaching and learning effects. On the one hand, enrich the evaluation indicators. On the basis of assessing students' technical mastery, add indicators such as ideological and political literacy, teamwork, and sense of social responsibility. Teachers can construct a diversified evaluation index system from four aspects: mastery of professional knowledge, improvement of ideological and political literacy, enhancement of social responsibility, and applicability of teaching models [11,12]. Taking "project-based" assessment as an example, in addition to evaluating the scientificity and feasibility of technical schemes, teachers should also focus on evaluating students' thinking on technical ethics, social impact, etc., to guide them to think about the social value of technology while applying it [13]. On the other hand, pay attention to process evaluation. For ideological and political education, its effect is not achieved overnight, but slowly reflected in the cultivation and accumulation of students' daily learning and behavioral habits. Thus, process evaluation should run through all links of IoT course teaching. Teachers can continuously observe, record, and evaluate the development and changes of students' ideological and political literacy, such as sense of responsibility and ethical concepts, through various ways, such as classroom interaction performance, practical report writing, and participation in teamwork [14,15]. Of course, in addition to teachers as the evaluation subject, students, enterprises, etc. can also participate in the evaluation, to more comprehensively and objectively evaluate students' comprehensive performance.

4. Conclusion

Based on the above research and analysis, to truly promote the curriculum ideological and political education in IoT courses in private universities from "formal integration" to "substantive integration", teachers should strive to build a comprehensive, diverse, progressive, and mutually supportive curriculum ideological and political system. Teachers should dig deep into the ideological and political elements hidden in the teaching content of IoT courses, actively explore their connection with professional knowledge, and at the same time actively introduce diversified teaching methods such as case analysis and project-driven, construct a diversified and comprehensive evaluation system, and take multiple measures to silently integrate ideological and political elements into all links of IoT course teaching, promote the integrated development of curriculum ideological and political education and IoT teaching, give full play to the unique educational role of the course, and ultimately achieve the subtle educational effect.

Disclosure statement

The author declares no conflict of interest.

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