Original Paper

The Conception and Teaching Practice of the Ideological and Political Content of the Course "Fundamentals of Railway Signaling"

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Abstract

This article aims to explore the organic combination of the professional core course "Fundamentals of Railway Signals" and ideological and political education, analyze the importance of ideological and political education in professional teaching, and explore how to integrate "Fundamentals of Railway Signals" with specific teaching practices. Ideological and political elements are integrated into the curriculum to improve students' comprehensive quality. Through practical exploration in case analysis, teaching method innovation, and evaluation system construction, it provides reference for ideological and political education in other professional courses.

Keywords

Railway Signaling Basics, ideological and political education, teaching practice, teaching methods, evaluation system

1. Introduction

In today's era of rapid development of the transportation industry, railway signaling technology, as a core element to ensure safe train operation and improve transportation efficiency, has become increasingly important. The "Fundamentals of Railway Signaling" course is a core course for majors such as railway engineering, railway signaling, rail transit signaling and control, and is of great significance for students

to master the basic principles, applications and development trends of railway signaling systems. Traditional teaching methods focus on the infusion of knowledge and the refinement of skills, often neglecting the cultivation of students' ideological and political qualities. In view of this, in order to comprehensively improve students' comprehensive literacy and cultivate high-quality talents that adapt to the needs of social development, it is particularly critical to skillfully integrate ideological and political education into the teaching of the "Railway Signaling Fundamentals" course.

2. The Necessity of Ideological and Political Education

The "Railway Signaling Basics" course not only requires students to master the basic principles and operating skills of the railway signaling system, but also requires students to have personal accomplishments, professional qualities and ideals and beliefs. Through ideological and political education, students can improve their personal accomplishments, enhance their professional qualities, and guide students to establish lofty ideals and lofty beliefs. At the same time, ideological and political education can also stimulate students' interest in learning and better understand the social value and significance of railway signaling technology. Therefore, integrating ideological and political education elements into the "Fundamentals of Railway Signaling" course is of great significance for improving students' comprehensive quality and cultivating high-quality talents that meet social needs.

3. Practical Exploration of Ideological and Political Education

3.1 Overall Course Design Ideas

Based on the established goals of professional talent training and the guidance of curriculum standards, and on the basis of the overall design of the curriculum structure, we conduct an in-depth analysis of each knowledge point and skill point, and explore the ideological and political elements contained therein. Design a scientific method to integrate ideological and political elements into the curriculum, and extensively collect ideological and political teaching materials to construct a practical ideological and political teaching design plan. During the implementation process, feedback and adjustments were continued to continuously optimize and improve this teaching design plan, as shown in Figure 1.
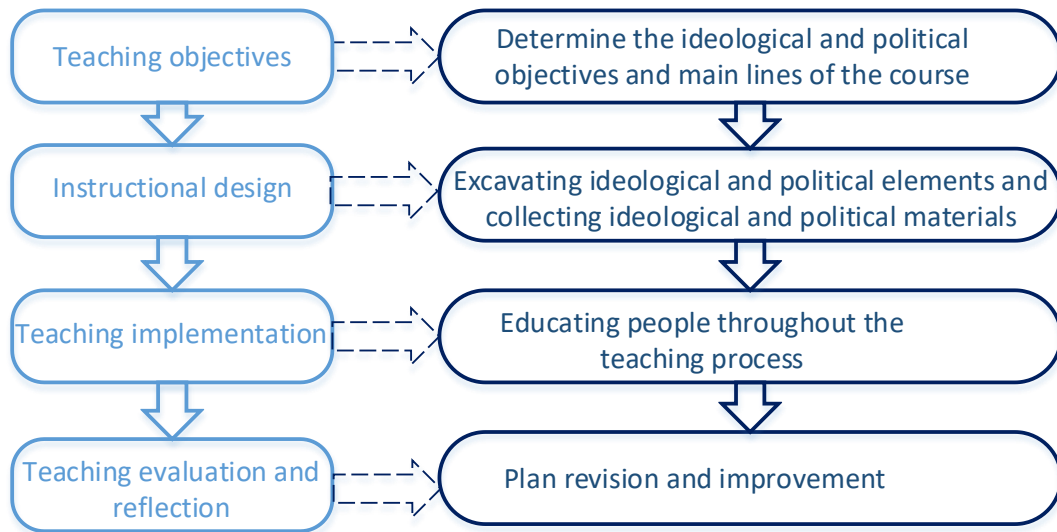
Figure 1. Overall Course Design Idea

3.2 Teaching Methods

To better integrate elements of ideological and political education into the curriculum, a variety of teaching methods are adopted. First of all, the lecture method is the most frequently used method in daily teaching. It mainly uses teachers to explain knowledge orally, demonstrate or display relevant materials in the classroom. Through this teaching method, the most basic knowledge, theories, and skills in the course are taught to students. Secondly, in the process of integrating ideological and political elements into course teaching, the most commonly used method is the case teaching method. The case teaching method is based on real situations and can display knowledge points intuitively and vividly. During the teaching process, representative cases related to railway signals are selected for discussion to help students deeply understand their personal accomplishments, professional qualities, and ideals and beliefs. Finally, the project-based teaching method is also a teaching method that is being actively explored. By guiding students to participate in practical projects such as railway signaling system design, installation, and commissioning, students can improve their professional skills and professional qualities in practice. Although the method of teaching is constant, it does not need to stick to one pattern. The most important thing to choose is appropriateness and appropriateness. The quality of a teaching method does not lie in whether it is traditional or novel, but in whether it can effectively convey knowledge and inspire thinking. In addition, we also enrich teaching methods and forms to improve teaching effects, such as multimedia teaching, online teaching and other modern information technology means.

3.3 Integration of Course Content and Ideological and Political Elements

The "Railway Signaling Basics" course focuses on the combination of ideological and political elements with professional knowledge and skill points in the teaching content. The first is an introduction to the development history of railway signaling and the overall framework of railway signaling; secondly, from basic learning to in-depth professional research, from theoretical exploration to practical operation, a

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"point-line-surface progressive" curriculum idea based on professional knowledge and skill points is constructed. Political teaching model.

(1) Teaching of professional knowledge and skills

The teaching of professional knowledge and skill points is mainly completed through three levels of teaching: "point, line and surface". The first is to allow students to master the composition, functions, working principles and other related knowledge of basic railway signaling equipment through the first level of "point" level teaching, such as signals, switch machines, relays, track circuits, etc.; the second is to use " The "line" level teaching allows students to complete the mastery of the interlocking system and interval blocking system in railway lines on the basis of mastering the first level learning content; the third is to allow students to complete the signal system through "face" level teaching. The key technologies—a comprehensive and systematic understanding of the train operation control system and train dispatching command system.

(2) Integration of ideological and political elements

The integration of ideological and political elements is mainly based on the "point-line-surface progressive" course ideological and political teaching model based on professional knowledge and skill points. First, it corresponds to the "point" level teaching to enable students to master the composition, functions, and functions of signal equipment. Working principles and other relevant knowledge, and strengthen the cultivation of personal accomplishment. The second is teaching corresponding to the "line" level, so that students can complete the understanding of the interval block system in railway lines and become proficient in using computer interlocking systems based on mastering the first-level learning content, and strengthen the cultivation of professional qualities. The third is teaching corresponding to the "surface" level, which mainly combines the teaching content at the "point" and "line" levels to enable students to strengthen the cultivation of ideals and beliefs while completing key tasks such as signaling systems, train operation control systems, and train dispatching and command systems. Comprehensive and systematic understanding of technology.

a. Integration of ideological and political elements at the first level of "point"

Teaching content: The teaching content at this level is based on "equipment and equipment" and mainly includes teaching content such as signals, switch machines, relays, and track circuits.

Ideological and political elements: The ideological and political elements at this level take "personal cultivation" as the core and mainly integrate ideological and political elements such as good habits, friendliness, independent thinking, and healthy psychology.

Case presentation: First, it talks about the knowledge point of "switch machines and turnout composition and functions", introduces the "April 29 major railway accident at Rongjiawan Station on the Beijing-Guangzhou Line", and illustrates: No matter how good the technology is, no matter how perfect the regulations are, At the practical level, it cannot replace people's own qualities and good habits. The second is to introduce the "Railway Man in Daba Mountain" case from "Economic Half Hour" to the "Composition of Turnouts" knowledge point to illustrate that work should have a perseverance attitude,

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harmonious and friendly relationship, a good mentality, a healthy heart and a strong body. The third is to explain the knowledge point of "relays". First, let students learn chapter knowledge by themselves, then classify the types of relays, find out the structural differences, and think about what functional differences will be caused by the structural differences? By allowing students to study independently, we deepen their understanding of knowledge points and develop their ability to think independently. Fourth, when explaining the knowledge point of "Signal", the introduction of design concepts such as "Double Filament Signal" and "Red Light Transfer" can allow students to have a deeper understanding of the "fail-safe" design principle and understand how signal engineers design signaling equipment. You should have the ability to think independently and good study and work habits. Fifth, knowledge points such as "The basic working status of rail circuits" are introduced into the "Innovation in Progress" Centennial Beijing-Zhangjiakou "Upgrade Road" series of cases to guide students to grasp the general trend of the times, think independently, and be courageous forge ahead at the forefront of the times. pioneer.

b. Integration of ideological and political elements of the second level "line" Teaching content: The teaching content at this level is based on "line system" and mainly includes teaching content such as station interlocking system and interval blocking system.

Ideological and political elements: The ideological and political elements at this level take "professional quality" as the core and mainly incorporate ideological and political elements such as rigor and seriousness, seeking truth from facts, unity and cooperation, and hard work.

Case presentation: First, introduce the case of "Stand-puller in the train marshalling station" to the knowledge point of "Station Interlocking System" to cultivate students' craftsmanship with oriental colors such as "patience, concentration, perseverance, indifference, precision, and persistence". . Guide students to be dedicated to their jobs, endure hardships and stand hard work. The second is to introduce the knowledge points of "Station Interlocking System" and introduce the case of "New Coronavirus Fight" to guide students to not be afraid of difficulties, be brave enough to take responsibility, dare to be the first, and have a deep sense of professional mission. The third is to cultivate students' awareness of respecting regulations, rules, orders and prohibitions, unity and cooperation, and seeking truth from facts through on-site practical operations and explanations of experimental operating procedures and experimental failures in experimental projects such as "Interval Occlusion". The fourth is to introduce the knowledge point of "railway signals to ensure railway transportation safety" and introduce the case of "7.23 extremely serious railway traffic accident on the Yongwen Line". Through the case simulation video viewing, it is pointed out: Railway signals are no small matter, human life is at stake; a small negligence, a violation Any operation or carelessness will cause losses to people's lives and national property, and will bring bloody lessons; remember the past and keep the alarm bells ringing; let students correct their attitude towards work and life - they should be rigorous and conscientious and avoid carelessness.

c. Integration of ideological and political elements at the third level of "face" Teaching content: The teaching content at this level is based on "line network system" and mainly includes teaching content such as train dispatching command system and train operation control system.

Ideological and political elements: The ideological and political elements at this level take "ideals and beliefs" as the core, and mainly incorporate ideological and political elements such as awareness of the overall situation, love for the party and country, mission responsibility, and system confidence.

Case presentation: First, it talks about the knowledge point of "(ITCS Train Control System)", by telling that the enhanced train control system (ITCS Train Control System) used on the Qinghai-Tibet Railway Gela Line is based on wireless communication and GPS positioning technology developed by the American GE Company. The train control system enables students to understand the current international situation and integrate their personal ideal pursuit into the national and national cause of realizing the Chinese dream of great rejuvenation. Only then can they truly shoulder the mission entrusted by the times and assume historical responsibilities. The second is to introduce the case of "Beidou navigation services have entered ordinary life, and Beidou positioning users exceeded 500 million" in the knowledge point of "Positioning methods based on Global Navigation Satellite System GNSS" to introduce the civilian use of Beidou navigation services. Guide students to pay attention to the advanced technologies and applications of this discipline, focus on stimulating students' love for the party and country, shaping students' self-confidence and self-reliance, and enhancing students' innovative and collaborative spirit. The third is to introduce the case of "The Invisible Spring Festival Transport Front of "Focus Interview""when talking about the "Basic Tasks of the Transportation Scheduling System", so that students can deeply understand the institutional advantages of concentrating efforts on doing big things under the socialist system, strengthen system confidence, and establish Awareness of the big picture. The fourth is to talk about "CTCS level 4 is oriented to high-speed new lines or special lines. It is a train operation control system completely based on wireless transmission of information." The knowledge point introduces special lines---"Snowy Sky", one of China's four major projects in the new century. "Road---Qinghai-Tibet Railway" case. Through the narration of the construction process of the Qinghai-Tibet Railway and the discussion of the significance of the construction, students can deeply understand the superiority of the socialist system under the leadership of the Communist Party of China that concentrates efforts on major things, and enhance students' confidence in the path and system of socialism with Chinese characteristics.

3.4 Improvement of Course Evaluation System

In order to comprehensively evaluate students' learning effects and improvement of ideological and political literacy, a complete course evaluation system - the "M+N" process-based evaluation system - was established.

(1) "M+N" process-based evaluation system design ideas

The design idea of process-based evaluation of this course is guided by the "point-line-surface progressive" course ideological and political teaching model based on professional knowledge and skill

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points. According to the basic knowledge content involved in "Railway Signaling Fundamentals", it is broken down into "points" The three-level teaching module of "line and surface" allows students to learn and improve practical skills through theoretical lectures, knowledge competitions, and on-campus practical training to deepen the understanding and application of professional knowledge. Cultivate students' comprehensive professional capabilities and sustainable development capabilities. In the course implementation, multimedia teaching, case teaching methods, case analysis, practical training guidance, knowledge competitions and other forms are adopted to conduct process-based evaluation and assessment of the teaching methods and assessment methods related to the content design of each teaching module.

(2) Specific application of the "M+N" process-based evaluation system in teaching

According to the learning characteristics of students in this course, the course content is divided into three levels of teaching modules: railway signaling basic equipment module, interlocking system and interval blocking system module, and train operation control system and train dispatching command system module. And based on the talent training plan and actual job requirements, "3+3" process-based assessment is implemented for this course. The first "3" refers to the three-level teaching modules of the railway signaling basic equipment module, the interlocking system and interval blocking system module, and the train operation control system and train dispatching and command system modules. The second "3" refers to the assessment methods corresponding to the three teaching modules. As shown in Table 1.

Table 1. "3+3" Process Assessment Form

Teaching level	Teaching modules corresponding to teaching levels	Assessment method
The first level "point"	Basic equipment module railway signaling (semaphores, switch machines, relays, etc.).	Use "team assistance and group competition" to compete in basic knowledge of railway signaling.
The second level of "line"	Interlocking system and interval blocking system module	Use the "Rain Classroom" platform to assess basic knowledge points of railway signaling.
The third level "face"	Train operation control system module and train dispatching command system	Simulated practical training and examination papers are used to assess traffic dispatching and commanding.

4. Achievements and Challenges of Ideological and Political Education Curriculum

Through practical exploration, we found that integrating ideological and political education into the "Railway Signaling Basics" course has achieved remarkable results. The students' professional quality and ideological and political quality have been dually improved. They not only have solid knowledge of

railway signaling technology, but also have a strong sense of social responsibility and professional ethics. At the same time, students have accumulated valuable experience in participating in practical projects, which effectively enhanced their hands-on ability and innovative spirit.

However, we also face some challenges. First of all, how to better integrate ideological and political education with professional knowledge is a question that needs continuous exploration. It is necessary to further explore ideological and political elements in the course content and find an entry point that suits your own strengths. Secondly, it is also a question to be solved, how to innovate teaching methods to improve students' interest and participation. Continuously explore new teaching methods and means to stimulate students' interest and enthusiasm for learning. In addition, how to improve the course evaluation system and ensure objectivity and fairness also requires attention.

5. Conclusion and Outlook

Through practical exploration, we have deeply realized the importance and necessity of integrating ideological and political education elements into the "Railway Signaling Fundamentals" course. Practical explorations such as innovating teaching methods and improving the course evaluation system have achieved certain results through the integration of course content and ideological and political elements. But we are also facing some challenges and problems that require us to continue to explore and solve.

Looking to the future, in order to better cultivate students' comprehensive quality and social responsibility, we will continue to deepen the reform of ideological and political education in basic railway signaling courses, further improve course content, innovate teaching methods, and optimize the evaluation system. At the same time, we also hope to communicate and cooperate with other professional courses to jointly promote the in-depth development of ideological and political education in professional teaching.

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