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Application and Innovation of Heuristic Inquiry-Based Theoretical Teaching in the Cultivation of Unmanned Systems Engineering Professionals

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Abstract: This paper explores the application and innovation of heuristic inquiry-based theoretical teaching in the cultivation of unmanned systems engineering professionals. By analyzing the current status and challenges of talent cultivation in this field, the study elucidates the essence and characteristics of heuristic inquiry-based theoretical teaching and its applicability in this specialized education. The article focuses on the specific application of this teaching method in curriculum design, teaching implementation, and evaluation systems, and proposes innovative strategies in teaching philosophy, content, methods, and tools. Research indicates that heuristic inquiry-based theoretical teaching can effectively enhance students' self-directed learning capabilities, innovative thinking, and practical skills, providing new approaches and methods for cultivating high-quality unmanned systems engineering professionals.

Keywords: Heuristic inquiry-based teaching; Unmanned systems engineering; Talent cultivation; Teaching innovation.

1. Introduction

With the rapid development and widespread application of unmanned systems technology, PAP has an increasingly urgent demand for professionals in unmanned systems engineering. However, traditional teaching models struggle to meet the requirements for cultivating innovative and interdisciplinary talents. Heuristic inquiry-based theoretical teaching, as a student-centered approach that emphasizes self-directed learning and innovative thinking, offers new perspectives for talent cultivation in this field. This paper aims to explore the application and innovation of heuristic inquiry-based theoretical teaching in the cultivation of unmanned systems engineering professionals, providing theoretical foundations and practical guidance for improving teaching quality and cultivating high-quality talents.

2. Current Status and Challenges in Cultivating Unmanned Systems Engineering Professionals

The unmanned systems engineering program is an emerging discipline established in recent years to meet the needs of new combat force development. This program aims to cultivate interdisciplinary talents capable of designing, developing, operating, and maintaining unmanned systems, thereby supporting the intelligent development. However, the current talent cultivation model faces several challenges.

Firstly, the rapid development of unmanned systems technology and the fast pace of knowledge updates make it difficult for traditional teaching models to keep up. Secondly, the interdisciplinary nature of the program requires students to possess integrated knowledge and innovative thinking across multiple fields, which existing teaching methods struggle to effectively cultivate. Additionally, the unique demands for unmanned systems engineering professionals require students to have not only solid theoretical foundations but also strong practical skills and military literacy, posing higher demands on teaching. Therefore, exploring new teaching methods to improve the quality of talent cultivation has become a critical issue in the current educational reform of Armed Police academies.

3. The Essence and Characteristics of Heuristic Inquiry-Based Theoretical Teaching

Heuristic inquiry-based theoretical teaching is a student-centered, teacher-guided approach that emphasizes creating problem-based scenarios to encourage active thinking and exploration, thereby constructing knowledge systems and fostering innovative thinking and practical skills. This teaching method highlights the initiative and inquiry in the learning process, focusing on cultivating students' self-directed learning and problem-solving abilities.

Heuristic inquiry-based theoretical teaching has the following characteristics: First, it is problem-oriented, using challenging questions to stimulate students' interest and desire for inquiry. Second, it emphasizes teacher-student and student-student interactions, encouraging collaborative problem-solving through discussions and teamwork. Third, it focuses on developing students' critical thinking and innovative spirit, encouraging unique insights and solutions. Finally, it integrates theoretical knowledge with practical applications, enhancing students' practical skills through case studies and project designs. These characteristics make heuristic inquiry-based theoretical teaching particularly suitable for cultivating talents in unmanned systems engineering, a field that demands strong practical and innovative capabilities.

4. Application of Heuristic Inquiry-Based Theoretical Teaching in Cultivating Unmanned Systems Engineering Professionals

In curriculum design, heuristic inquiry-based theoretical teaching emphasizes a competency-oriented, modular, and hierarchical course structure. For example, the unmanned systems engineering curriculum can be divided into foundational theory modules, technical modules, and practical application modules, each incorporating inquiry-based questions and research projects to guide students in progressive learning and research.

In teaching implementation, various heuristic inquiry-based methods can be employed. For instance, case-based teaching can be used in theoretical courses to help students understand theoretical concepts and their practical applications through analyzing typical unmanned systems cases. Project-based learning can be applied in technical courses, enabling students to conduct research around specific projects and develop problem-solving skills. Simulation-based training can be used in practical courses, enhancing students' operational skills through virtual environments.

In evaluation systems, a diversified assessment mechanism should be established. Beyond traditional exams, formative assessments such as class participation, project completion, and innovative thinking should be emphasized. Peer and self-evaluations can be introduced to comprehensively assess students' learning outcomes and skill development. Additionally, feedback mechanisms should be established to adjust teaching strategies promptly and continuously improve teaching quality.

5. Innovation of Heuristic Inquiry-Based Theoretical Teaching in Cultivating Unmanned Systems Engineering Professionals

In teaching philosophy, a "student-centered, competency-oriented" approach should be adopted. Teachers should transition from knowledge transmitters to learning facilitators, focusing on cultivating students' self-directed learning and innovative thinking. Integrated learning should be emphasized, breaking disciplinary boundaries to foster students' comprehensive and interdisciplinary abilities.

In teaching content, the latest research and technological advancements in unmanned systems should be incorporated to maintain the curriculum's relevance and practicality. Task-based course modules can be developed, integrating real-world military needs with teaching content to enhance relevance and applicability. Additionally, military-specific content should be integrated to cultivate students' military literacy and operational capabilities.

In teaching methods and tools, modern educational technologies such as virtual reality and augmented reality can be utilized to create immersive learning environments, improving the intuitiveness and interactivity of teaching. AI-based personalized learning systems can be developed to provide customized learning paths and resources for students. Furthermore, collaborations with enterprises and military units should be strengthened to offer more practical opportunities, bridging theory and practice.

6. Conclusion

Heuristic inquiry-based theoretical teaching provides new perspectives and methods for cultivating unmanned systems engineering professionals. By applying this approach to curriculum design, teaching implementation, and evaluation systems, students' self-directed learning, innovative thinking, and practical skills can be effectively enhanced. Innovations in teaching philosophy, content, methods, and tools contribute to cultivating high-quality unmanned systems engineering professionals who meet the needs. Future efforts should focus on deepening educational reforms and refining the heuristic inquiry-based theoretical teaching system to cultivate more outstanding talents for the intelligent development.

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