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AI EMPOWERING THE CULTIVATION OF NEW-QUALITY CAPABILITIES OF MILITARY ACADEMY STUDENTS

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Abstract: The application of a new generation of artificial intelligence technology is driving the evolution of modern warfare toward intellectualization, unmanned operation and systematization, promoting the continuous innovation of operational concepts, and putting forward new capability requirements for modern military talents. The traditional talent training model of military academies, which is characterized by knowledge indoctrination and weak practical training in actual combat, can hardly meet the urgent demand for new-type talents in modern intelligent warfare. Based on the background of the transformation of operational modes, this paper analyzes the new-quality capability requirements of military academy students for intelligent warfare, such as human-machine collaborative thinking, complex system control and unconventional operational method innovation, expounds the era value of AI empowerment, and explores the implementation paths of AI empowering the cultivation of students' new-quality capabilities from three dimensions: curriculum system reconstruction, teaching model transformation and practical path optimization. It aims to provide theoretical reference and practical reference for military academies to deepen the reform of education and teaching and cultivate high-quality new-type military talents needed for strengthening the military.
Keywords: Artificial intelligence; Military talents; New-quality capabilities; Post competence

1 INTRODUCTION

On June 1, 2025, Ukraine launched the "Spider Web Operation", using swarm of unmanned aerial vehicles (UAVs) to raid Russian strategic air force bases and destroy dozens of Russian strategic bombers, creating a new form of warfare in the UAV era [1]. Since its outbreak in 2022, the Russia-Ukraine conflict has exerted a profound impact on international relations and major-power competition. A striking feature of the conflict is that both sides have employed artificial intelligence technologies on a large scale and in diverse forms for intelligence collection, drone operations, cyber warfare, and intelligent public opinion warfare. This has extended the scope of combat from the physical domains of land, sea, air, and outer space to the imperceptible digital and information battlefields [2]. Artificial intelligence technologies represented by large models, digital twins, intelligent simulation and unmanned systems are increasingly integrated into the military construction of countries around the world, driving a fundamental transformation of operational modes from "human-dominated" to "human-machine collaborative" and from "single combat" to "systematic confrontation". Artificial intelligence technology has become an important factor affecting the outcome of wars. Its application runs through the whole process of military operations, from intelligent command and control to unmanned collaborative operations, and also puts forward new requirements for the capabilities and qualities of military talents, which are no longer limited to traditional professional skills, but more emphasize the accomplishments of human-machine collaboration, systematic thinking and practical innovation.

Faced with the transformation of operational modes brought about by artificial intelligence technology, the problems that the curriculum system, teaching content and practical training in the traditional talent training model are disconnected from the needs of modern intelligent warfare have become increasingly prominent. Military academies serve as the core positions for cultivating military talents and carry the important mission of delivering high-quality military talents. How to promote the deep integration of the traditional talent training model with the needs of intelligent warfare, empower the cultivation of students' innovative practical capabilities with AI technology, and build an education system adapted to the new operational mode have become the core issues for military academies to deepen the reform of education and teaching.

Taking the talent cultivation of military academies as the research object, this paper puts forward the AI-empowered cultivation paths around the three core links of curriculum, teaching and practice in response to the new-quality capability requirements of military talents for intelligent warfare, striving to provide ideas and schemes for cultivating new-type military talents suitable for the needs of intelligent warfare.

2 NEW-QUALITY CAPABILITY REQUIREMENTS FOR MILITARY TALENTS UNDER THE TRANSFORMATION OF OPERATIONAL MODES

Artificial intelligence technology has broken the boundaries and rules of traditional warfare, driven the all-round transformation of operational modes, and put forward new requirements for the post competence of military academy students, which are embodied in three core capabilities [3].

2.1 Human-Machine Collaborative Thinking Ability

The massive data and second-level confrontation rhythm on the intelligent battlefield require military talents to abandon the traditional single manual decision-making thinking and establish a new thinking of "human-machine hybrid command and human-machine collaborative combat". In combat, artificial intelligence should function as a critical decision-support tool, leveraging its technical strengths in processing massive datasets, analyzing multidimensional situational information, and simulating complex battlefield environments. This integration serves to compensate for human limitations in information processing speed and operational precision. At the same time, it is essential to uphold the primacy of human decision-making in command and control, retaining authority over strategic direction, value-based judgments, and complex operational decisions. This approach facilitates human-machine synergy by leveraging the complementary strengths of both, thereby aligning with the operational requirements of intelligent warfare [4-5].

2.2 Complex System Control Ability

The core of intelligent warfare is systematic confrontation, which requires military talents to have a strong ability to control complex systems. On the one hand, it is necessary to fully master the performance parameters of intelligent equipment such as unmanned combat platforms, intelligent reconnaissance equipment and joint combat command systems, realize the organic integration of different combat units, and release the effectiveness of systematic combat [6]. On the other hand, it is necessary to have the ability of systematic research and judgment and risk prevention and control, accurately identify the vulnerable points of the combat system, predict sudden scenarios such as equipment failure and formulate preplans. At the same time, it is necessary to adapt to the "second-level combat rhythm" brought about by AI technology, make rapid decisions in complex battlefield environments, and grasp the initiative of battlefield command.

2.3 Unconventional Operational Method Innovation Ability

New operational styles empowered by AI are emerging one after another, and traditional operational methods are difficult to adapt to the new battlefield situation, which requires military talents to jump out of the original thinking mode, actively learn new technologies and empower the innovation of operational methods. It is necessary to combine the new AI combat forces, base on the characteristics of unmanned combat, intelligent confrontation and cross-domain linkage, and conduct in-depth research and exploration on unconventional operational methods such as unmanned assault, swarm suppression and intelligent deception. By studying the technical performance of intelligent equipment, flexibly combining and using equipment and innovating tactical operational methods, the organic integration of technology and operational methods is realized, and the combat capability of troops is improved.

In general, the requirements for military talents brought about by the transformation of operational modes are a comprehensive transformation from single skills to composite capabilities, which puts forward new requirements for the post competence and quality of military academy students, and also points out the direction for AI-empowered talent cultivation: taking combat needs as the guide, taking capability improvement as the core, and using AI technology to solve the pain points of traditional cultivation.

3 THE ERA VALUE OF AI EMPOWERING THE CULTIVATION OF NEW-QUALITY CAPABILITIES OF MILITARY ACADEMY STUDENTS

Integrating artificial intelligence into the whole process of talent cultivation in military academies is an inevitable choice to adapt to the transformation of operational modes and the talent demand of intelligent warfare, and also an inherent requirement to improve the quality of education. Its era value is concentrated in three aspects.

3.1 Solving the Pain Points of Practical Training in Actual Combat and Improving Training Effectiveness and Safety

Practical training in actual combat is an important link in military talent cultivation, but restricted by factors such as high risk, high cost and difficult scene reproduction, some high-intensity and high-difficulty training is difficult to carry out. AI simulation, digital twin and other technologies can build a highly realistic intelligent combat environment, equipment operation and problem disposal scenarios, reproduce the complexity of the battlefield, and enable students to complete practical training such as battlefield situation disposal and command, and intelligent equipment operation in a safe and controllable virtual environment. At the same time, virtual scenes can be flexibly adjusted and iterated repeatedly, allowing students to accumulate practical combat experience, effectively solving many limitations of traditional training, and improving the coverage and effectiveness of training [7].

3.2 Improving Cultivation Efficiency and Realizing Teaching Students in Accordance with Their Aptitude

AI technology can efficiently complete repetitive work such as literature retrieval, data processing and process monitoring, liberating students from tedious and mechanical labor, enabling them to focus on core innovation and problem research, and stimulating innovative thinking. At the same time, with the help of AI technology, it is possible to dynamically collect and analyze data such as learning behaviors, experimental processes and ability performance of students, accurately identify knowledge weaknesses and capability shortcomings, customize differentiated plans, push resources and assign tasks for different students, realize teaching students in accordance with their aptitude, and promote the capability advancement of students at all levels.

3.3 Connecting Battlefield Needs with Talent Cultivation and Promoting the Integration of Warfare and Education

The accurate connection between the supply side of talent cultivation and the demand side of the future battlefield is an urgent need for military talent cultivation. With the help of AI technology, the latest intelligent combat cases of the world can be quickly transformed into teaching resources, promoting the resonance of talent cultivation content with battlefield needs. It is essential to immerse students in realistic combat scenarios during their academic training, enabling them to become familiar with the operational paradigms of intelligent warfare and to develop doctrinal proficiency in intelligent combat. Such exposure ensures a seamless transition from the academic environment to the battlefield, thereby providing critical personnel support for the generation and enhancement of combat effectiveness.

4 IMPLEMENTATION PATHS OF AI EMPOWERING THE CULTIVATION OF NEW-QUALITY CAPABILITIES OF MILITARY ACADEMY STUDENTS

With the primary objective of enhancing new-quality capability development of students and adhering to the principle of integrating warfare with education, military academies should comprehensively facilitate the application of AI technologies across all facets of talent cultivation. A strategic focus should be placed on three interconnected dimensions—namely, the redesign of curricula, the transformation of pedagogical models, and the refinement of practical training pathways. Such an approach not only systematically consolidates the foundational elements necessary for cultivating new-quality capabilities but also contributes to the establishment of a comprehensive, AI-empowered educational framework.

4.1 Constructing a Hierarchical and Progressive AI Deep Integration Curriculum System

As the core carrier of talent cultivation, the curriculum system should be based on the characteristics of military academy talent cultivation and the needs of strengthening the military goal, break the traditional knowledge barriers, integrate AI concepts, methods and tools into courses at all levels according to the cultivation gradient, construct a hierarchical and progressive curriculum system, and realize the deep coupling of AI and military education [8-9].

At the general education foundation stage, courses such as Military Artificial Intelligence Foundation, Military Application of Large Models and Military Data Literacy are offered to help students build an intelligent knowledge base, establish intelligent thinking, master basic AI tools and logic proficiently, and use AI to complete basic literature retrieval, military data sorting, simple equipment modeling and other tasks, laying a foundation for subsequent learning.

At the disciplinary foundation stage, content such as intelligent algorithms, intelligent simulation and equipment intelligence are organically embedded in core professional courses such as Weapon System Engineering and Military Command and Control, guiding students to use AI technology to solve typical military problems in their major, realize the integration of professional knowledge and AI technology, and cultivate professional intelligent application capabilities.

At the professional expansion stage, facing the development needs of military intellectualization, interdisciplinary courses such as Intelligent Unmanned System Design, Military Big Data Analysis and Cross-Domain Collaborative Combat Support are offered to cultivate students' systematic thinking and cross-domain innovation capabilities. At the same time, combined with the actual combat needs of the troops, design penetrating project-based learning tasks, introduce real combat cases, transform practical problems into teaching resources, and promote students to improve their capabilities in solving practical problems.

4.2 Innovating the "Teacher-Led, AI-Supported, Student-Centered" Collaborative Teaching Model

The conventional one-way indoctrination model, wherein teachers transmit knowledge and students passively receive it, should be fundamentally restructured. Emphasis should be placed on transitioning the educational paradigm from knowledge transmission to capability cultivation. To this end, a collaborative teaching framework characterized by teacher-led instruction, AI-assisted support, and student-centered learning should be established. This model delineates the distinct roles of each participant, thereby fostering pedagogical synergy and leveraging the complementary strengths inherent in human–machine collaboration [10].

The role of educators should transition from mere disseminators of knowledge to facilitators of learning and strategic guides. Within this reconceptualized pedagogical framework, instructors are expected to focus their pedagogical efforts on the design of instructional tasks, the construction of realistic combat scenarios, and the organization of academic seminars. These tasks should be informed by the evolving frontiers of military intellectualization and the operational

requirements of the armed forces, with the objective of guiding students in addressing substantive, real-world problems. Such an approach not only reinforces the sense of mission in contributing to national defense of students but also cultivates their capacity for innovative thinking and enhances their professional military competence.As an intelligent assistant, AI technology undertakes transactional work such as intelligent Q&A, simulation deduction, process recording and data analysis, and provides all-weather personalized learning support. Relying on the AI system, students can obtain knowledge and operation feedback in real time; with the help of the AI simulation platform, carry out training such as virtual experiments, equipment simulation and combat deduction, and optimize schemes repeatedly in a safe environment; the AI learning analysis system records students' learning and practical data, providing scientific support for teachers' precise teaching.

As the main body of learning, students should take the initiative to participate in curriculum learning, training simulation and other links under the guidance of teachers and the support of AI, put forward problems independently, design schemes, carry out practices and summarize experience. Through independent inquiry and team cooperation, they will realize the transformation from "passive learning" to "active research", and cultivate innovative practical capabilities and collaborative combat awareness.

4.3 Implementing an Innovation-Oriented Practical Teaching Path Driven by Actual Combat

Guided by the imperatives of actual combat and anchored in a project-driven pedagogical approach, innovative practice should be embedded throughout the entire talent cultivation process. This entails promoting inquiry-based, project-based, and case-based teaching methodologies to ensure the effective transformation of theoretical knowledge into practical capabilities.

Practical tasks should be designed in accordance with real-world combat requirements and closely aligned with the operational imperatives of intelligent warfare. By transforming authentic military missions—such as the collaborative engagement of manned and unmanned reconnaissance systems—into student-centered project-based exercises, learners are directly exposed to the complexities of actual combat scenarios. This pedagogical approach cultivates battlefield-oriented thinking and enhances practical operational capabilities [11]. An interdisciplinary, project-driven approach to team practice should be implemented. Comprehensive projects that reflect the operational needs of the armed forces should be designed, requiring students to engage—within team-based settings—in the entire research and development cycle, including needs analysis, conceptual design, modeling and simulation, and experimental validation and refinement. Such an approach fosters innovative practical capabilities, systematic thinking, and collaborative competencies through the process of project-based inquiry and development.

An integrated online–offline practical teaching platform should be established. The online component delivers curriculum resources, AI-based simulation tools, and remote collaboration channels, thereby empowering students to engage in independent study and collaborative inquiry. The offline component comprises physical laboratories, intelligent equipment simulation training facilities, and combat simulation environments, offering students tangible platforms for hands-on operational training and realistic combat scenario exercises. This dual-platform architecture transcends temporal and spatial constraints, thereby enhancing learning efficiency and instructional flexibility.

5 CONCLUSION

The military application of artificial intelligence is driving a fundamental transformation of operational paradigms toward intellectualization, unmanned systems, and systematization. This evolution imposes new requirements on the professional competencies of military academy students and necessitates corresponding reforms in talent cultivation models.

In response, military academies should adopt AI technology empowerment as a strategic entry point, closely align with battlefield requirements and the overarching goal of strengthening national defense capabilities, and promote the deep integration of AI with military higher education. By reconstructing curricula, innovating pedagogical models, and optimizing practical training pathways, institutions can effectively enhance students' innovative practical capabilities and cultivate high-caliber, new-type military talents capable of undertaking critical defense missions. The implementation of a hierarchical and progressive AI-integrated curriculum system, a tripartite collaborative teaching model, and a combat-driven practical pathway collectively addresses persistent challenges in traditional training—including the difficulty of replicating real combat scenarios, low cultivation efficiency, and the inability to tailor instruction to individual needs—thereby laying a solid foundation for improving the overall quality of talent cultivation.

Looking ahead, as AI technology and educational digitalization continue to advance, military academies must deepen the integration and innovation of AI within talent development frameworks. Ongoing efforts should focus on optimizing the educational ecosystem, enriching practical teaching scenarios, and strengthening the integration of academic instruction with combat readiness. Such endeavors will contribute to cultivating a new generation of military professionals equipped with intelligent literacy, engineering capabilities, and innovative thinking, thereby providing robust personnel and intellectual support for the modernization of national defense and the armed forces.

COMPETING INTERESTS

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