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A Comparative Study Of The Current State Of Academic And Professional Master's Degree Programs In Higher Education Guided By Cognitive Networks

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Abstract: Against the backdrop of the continuous development of graduate education and cognitive networks, this paper focuses on the current state of academic and professional master's degree programs in higher education, conducting a comparative analysis from the perspective of cognitive networks. First, the basic characteristics of cognitive networks—openness, interactivity, and intelligence—are elucidated. Second, from dimensions such as educational objectives and positioning, curriculum systems and teaching models, mentor guidance and learning methods, and evaluation systems and outcomes-based approaches, the differences between academic and professional master's degree programs guided by cognitive networks are thoroughly analyzed: Academic master's programs emphasize theoretical depth and research innovation, leveraging the academic platforms and resources of cognitive networks to enhance their academic capabilities; Professional master's programs emphasize practical empowerment and professional competence, leveraging the cognitive network's industry-academia integration resources and virtual simulation platforms to strengthen practical application. Based on this, the paper proposes a strategy for the 分类 cultivation and collaborative innovation of academic and professional master's programs, aiming to provide theoretical support and practical guidance for optimizing the structure of graduate education and enhancing the quality of graduate training.

Keywords: Cognitive Network; Graduate Education; Academic Master's Programs; Professional Master's Programs

1.Introduction

In the context of the integration and development of “new engineering” and “new liberal arts,” higher education in China is undergoing profound changes. As a key component of higher education, graduate education is also continuously adjusting and optimizing its structure. In recent years, the scale of graduate admissions in China has continued to expand. In 2025, the planned enrollment for master's degree programs is 872,000 students, with 270,000 planned for academic master's programs, a decrease of 6,000 students compared to 2024, representing a year-on-year decline of 2.22% (as shown in Figure 1.); among these, academic master's programs account for 31.01% of the enrollment, while professional master's programs account for 68.99% (as shown in Figure 1.2). According to statistics on the enrollment plans of 677 universities in 2025, 12.7% of institutions only admit professional master's degree students, and 87.4% of institutions have a professional master's degree enrollment plan accounting for over 60% of their total enrollment, an increase of 9% compared to 2024; 3.25% of institutions have a professional master's degree enrollment plan accounting for less than 50% of their total enrollment, a significant decrease compared to 2024. In the 2025 enrollment plans for various disciplines, engineering plans to enroll 313,000 students (accounting for 35.9%), far exceeding other disciplines. Additionally, disciplines with a large number of enrollments include management, which plans to enroll 139,000 students (accounting for 16%); medicine, which plans to enroll 99,000 students (accounting for 11.3%); and education, which plans to enroll 60,000 students (accounting for 6.9%). In the context of the rapid development of cognitive networks, conducting in-depth research on their differentiated impact on academic and professional master's degree programs holds significant theoretical and practical value. From a theoretical perspective, this research contributes to enriching and refining the theoretical framework of graduate education, providing educators with new research perspectives and approaches, and deepening understanding of the characteristics and patterns of various graduate education programs. From a practical perspective, it can provide strong theoretical support and practical guidance for higher education institutions and educational administrative departments to continuously optimize the structure of graduate education, establish a scientific and effective training system, and improve the quality of graduate education.

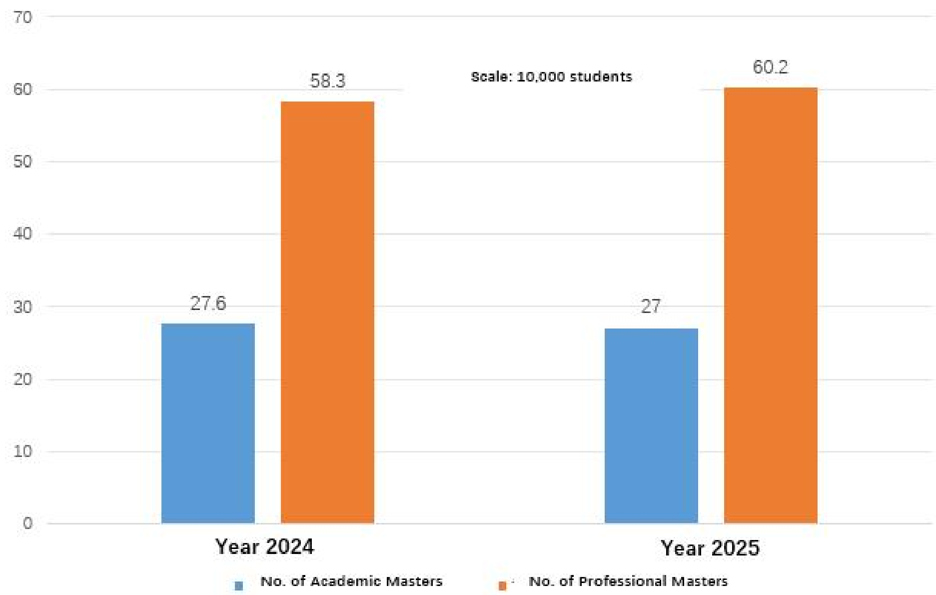

Figure 1. Changes in the enrollment plans for academic master's and professional master's programs for 2024-2025

Data source: "2025 National Postgraduate Enrollment Survey Report"

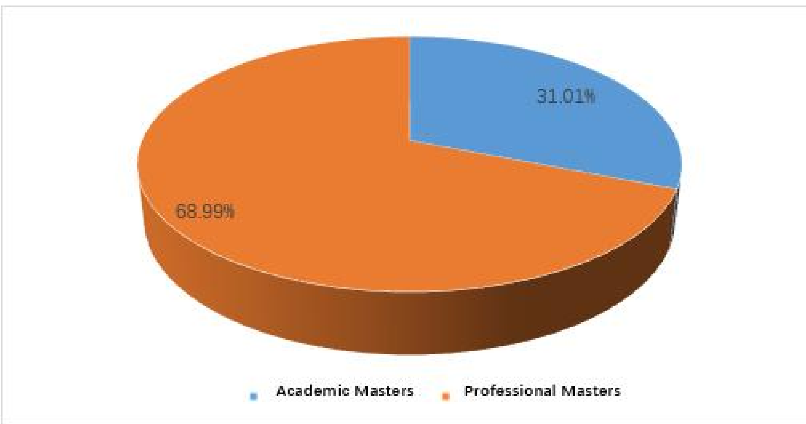

Figure 2. Proportion of academic master's and professional master's enrollment plans in 2025

Data source: "2025 National Postgraduate Enrollment Survey Report"

2. Overview of Cognitive Networks

The so-called "cognitive network" primarily refers to an intelligent network architecture that integrates advanced technologies such as big data, machine learning, and artificial intelligence. It can effectively perceive the external environment, understand and learn from the data it collects, and dynamically adjust the internal configuration of the communication network to intelligently adapt to changes in the external environment. Compared to traditional networks, cognitive networks have the following basic characteristics: First, openness. Cognitive networks break through the closed nature of traditional networks, enabling the free flow of information and knowledge. Through cognitive networks, users can freely access academic resources and research findings from around the world, no longer constrained by time and space. This openness allows graduate students to access a broader range of academic information, further expanding their academic horizons and providing richer materials for academic research and knowledge learning. Second, interactivity. Cognitive networks provide convenient communication channels for interaction and exchange among different users. Graduate students can engage in real-time exchanges and discussions with experts and peers through academic platforms and online forums, share research ideas and experiences, and also receive feedback and suggestions from others. This interactivity promotes knowledge sharing and innovation, significantly stimulating graduate students' learning enthusiasm and initiative. Third, intelligence. Cognitive networks possess strong intelligent analysis and decision-making capabilities, combining user behavior data and preferences to provide personalized and targeted learning recommendations and services.

3.Cognitive Network-Guided Master's Degree Program Objectives and Specialization

3.1 Academic Master's Degree: Focus on Theoretical Research and Scientific Innovation

The fundamental objective of academic master's degree education is to cultivate academic research talent, with the aim of establishing a solid theoretical foundation and fostering students' innovative abilities and critical thinking skills. Under the guidance of cognitive networks, the objectives and specialization of academic master's degree programs have been significantly expanded and deepened. Cognitive networks provide academic master's degree students with broader access to academic resources. Through interdisciplinary literature databases such as CNKI and Web of Science, students can more conveniently access a vast amount of academic literature covering cutting-edge research findings across various disciplines. These databases not only contain a large number of theses, academic journals, and research reports but also offer powerful search functions, enabling precise searches based on keywords, authors, research institutions, and other dimensions, thereby helping students quickly locate the required literature. Academic communities, such as Research Gate, provide academic master's students with a platform for exchange and cooperation with international peers. On this platform, students can share their research results, ideas, and views, engage in in-depth exchanges and discussions with other scholars, and receive feedback and suggestions from different academic backgrounds, thereby broadening their research perspectives and better stimulating innovative inspiration. Under the guidance of cognitive networks, academic master's students have a significant advantage in tracking the forefront of their disciplines. They can keep abreast of the latest research trends and developments at home and abroad, grasp hot issues and research directions in their fields. When faced with a vast amount of academic information, students should learn to use scientific and effective methods to screen and identify information, judging its relevance, reliability, and value.

3.2 Professional Master's Degree: Practice-Oriented and Career-Focused

Professional master's degree programs are closely aligned with industry needs, aiming to cultivate high-level applied talents with solid professional knowledge and strong practical skills, with a focus on developing the ability to solve complex real-world problems. The development of cognitive networks offers new opportunities and platforms for professional master's degree programs. Virtual simulation platforms provided by cognitive networks, such as clinical diagnosis and treatment simulation systems and engineering management case repositories, offer professional master's students practice environments that closely resemble real-world scenarios. In the engineering management case repository, students can access various real-world engineering project cases covering multiple stages such as project planning, implementation, monitoring, and evaluation. Through comprehensive analysis and simulation exercises of these cases, students can better grasp the specific processes and methods of engineering management and enhance their ability to solve real-world problems. The industry-education integration database is another important resource provided by Cognitive Network for professional master's degree programs. In the database, students can access the latest industry information, including market demands, technological trends, and corporate case studies, to familiarize themselves with industry needs and development trends, thereby integrating their knowledge with practical applications. Additionally, the database offers students numerous opportunities to collaborate with companies, allowing them to participate in real-world projects and gain practical experience to enhance their professional capabilities. In the era of cognitive networks, professional master's students have made significant progress in the "knowledge-practice-innovation" transformation. With the support of the industry-academia integration database and virtual simulation platforms, students can better apply their knowledge to practical scenarios, continuously innovate and refine solutions through practice, and significantly enhance their ability to solve real-world problems and their innovative capabilities.

Table 1. Comparison of Master's Degree Program Objectives and Positioning Guided by Cognitive Networks

Program	Academic Master's Degree	Professional Master's Degree
Educational objectives	With the core mission of cultivating academic research talent, we are committed to building a solid theoretical	To provide universities and research institutions with a reserve of talent, promote theoretical innovation and academic development in disciplines;

	foundation and fostering students' critical thinking and innovative abilities.	leverage the academic resources and platforms of cognitive networks to enhance academic capabilities and facilitate tracking of cutting-edge developments in disciplines.
Positioning	Focusing on industry needs, the program aims to cultivate high-level applied talents with solid professional knowledge and strong practical abilities, emphasizing the cultivation of skills to solve complex real-world problems.	To meet the urgent demand for high-level applied talents across all sectors of society, promote the conversion and practical application of scientific and technological achievements; leverage the virtual simulation platform and industry-education integration resources of cognitive networks to strengthen practical application and enhance professional capabilities.

4.Comparison of the Current State of Academic and Professional Master's Degree Programs Guided by Cognitive Networks

4.1 Comparison of Curriculum Systems and Teaching Models

The curriculum system for academic master's degree programs is based on the principle of "theoretical deepening + methodological training." In terms of course design, emphasis is placed on offering advanced theoretical courses, such as "Advanced Macroeconomics" and "Advanced Microeconomics" in the field of economics, which delve into the complex models and cutting-edge theories of the discipline. Students are required to have a solid mathematical foundation and a deep theoretical background, aiming to help them establish a comprehensive and systematic theoretical framework. Among these, the academic seminar module is a crucial component of the curriculum system. Through regular academic salons, seminars, and related activities, students engage in in-depth research and discussions on specific academic themes, sharing and exchanging their research ideas and insights. This fosters innovative thinking through intellectual exchange, thereby cultivating critical thinking and independent research capabilities. Under the guidance of cognitive networks, the "MOOC + online workshop" teaching model is gaining momentum, injecting new vitality into academic master's education. MOOC platforms focus on high-quality course resources from top-tier universities and scholars worldwide, enabling students to access cutting-edge academic courses from the comfort of their homes. With the support of online workshops, students can engage in real-time collaboration and exchange with peers from various regions, tackling academic challenges together and continuously broadening their academic horizons.

The curriculum system for professional master's education is established based on the principle of "case-driven + practice-oriented." From the perspective of course content, it closely integrates industry practice projects and cutting-edge cases. Taking the business administration major as an example, Harvard Business Cases are selected, which include real-world business cases covering marketing, corporate strategy, financial management, and other topics. Through in-depth analysis and discussion of these cases, students can familiarize themselves with the various issues and challenges businesses face in real-world operations while learning to apply their knowledge to propose solutions. Through the dynamic case library of the cognitive network, scenario-based simulation teaching can be conducted for professional master's programs. Using virtual simulation technology, students can immerse themselves in various real-world scenarios and conduct simulated operations and decision-making. However, due to the rapid development of the industry and the constant changes in technology and the market, the update speed of the case library often cannot keep pace with the pace of industry development, resulting in a significant lag between the cases studied by students and the actual industry situation. This makes it difficult for students to promptly grasp the latest practical experience and industry trends, severely affecting the relevance and effectiveness of professional master's education.

4.2 Comparison of Mentor Guidance and Learning Methods

The research path for academic master's students is guided by mentors and follows the logic of "problem-driven—literature critique—hypothesis verification." Mentors leverage their deep professional knowledge and extensive academic experience to guide students in identifying research innovation points and gaps by critically reading and analyzing a large volume of literature, thereby formulating corresponding research hypotheses. They also guide students in applying scientific and effective research methods for verification. Taking computer science as an example, the mentor may guide students to focus on the optimization of artificial intelligence algorithms, critically review existing algorithm literature to identify issues in efficiency and accuracy, propose improvement hypotheses, and guide students in experimental verification. Bibliometric tools for cognitive networks, such as Citespace, provide significant assistance in designing academic master's research; These tools enable visualization analysis of massive amounts of literature data, helping students quickly grasp the cutting-edge trends, research hotspots, and knowledge structures within their discipline. Through Citespace, students can intuitively see the close connections and developmental trajectories between various research themes, thereby more accurately defining their own research direction and priorities.

Professional master's programs adopt a "dual mentor system," a training model that comprehensively integrates high-quality resources from both within and outside the university to promote the deep integration of theory and practice. On-campus mentors typically possess extensive teaching experience and profound academic expertise, primarily responsible for laying a solid theoretical foundation for students, guiding them in academic research, and assisting with thesis writing. Off-campus mentors usually come from the front lines of industry, equipped with keen market insight and rich practical experience, primarily responsible for guiding students in practical applications and helping them understand actual needs and industry trends. Cross-disciplinary collaboration platforms provided by Cognitive Network, such as the Enterprise WeChat Workbench, facilitate communication and collaboration between dual mentors and students. Through these platforms, on-campus mentors, off-campus mentors, and students can communicate and interact anytime, anywhere, share information and experiences, and jointly address various issues encountered by students during their learning and practical training. Off-campus mentors may lack teaching experience and have busy daily schedules, which may result in insufficient standardization in their guidance of students. Some external mentors may struggle to meet the school's requirements for regular communication and guidance with students, and the content of their guidance may lack specificity and systematicity, severely impacting the effectiveness of the dual-mentor system and the quality of professional master's education.

4.3 Comparison of Evaluation Systems and Outcome-Oriented Approaches

The evaluation system for academic master's programs focuses on research projects and academic papers as key indicators. Academic papers are a crucial metric for assessing the academic level and research capabilities of academic master's students, with explicit requirements for students to publish high-quality papers in reputable academic journals. The innovation, depth of research, and academic value of these papers are the primary evaluation criteria. Research projects are also a crucial component of the evaluation. Students may independently apply for research projects or participate in their mentors' research projects, demonstrating their teamwork skills and research capabilities through project implementation. In the field of physics, academic master's students may need to publish papers in top-tier global journals such as Physical Review Letters or participate in National Natural Science Foundation projects to achieve outstanding evaluation results. Plagiarism detection systems, such as Turnitin, can accurately detect plagiarism and academic dishonesty in academic papers, ensuring their originality and academic integrity. Journal recommendation tools can combine students' research directions and paper quality to recommend targeted academic journals, improving the success rate and efficiency of paper submissions.

The evaluation system for professional master's programs emphasizes the conversion of practical achievements, using industry solutions and patent applications as important evaluation criteria. Industry solutions demonstrate students' ability to solve practical problems and their in-depth understanding of the industry, while patent applications demonstrate students' innovative capabilities and technical application abilities. Taking the electronics and information technology field as an example, professional master's students can demonstrate their professional competence and practical value through practical achievements such as developing new electronic devices, applying for related patents, and providing scientific and efficient communication technology solutions for enterprises. Meanwhile, the technology transfer platforms provided by Cognitive Network, such as the National Technology Transfer Center Database, serve as a "bridge" connecting the practical achievements of professional master's programs with market demand. Through these platforms, students can bring their practical achievements to the market, achieve technology transfer and application, and create greater value for enterprises.

Table 2. Comparison of the Current State of Academic and Professional Master's Degree Programs Guided by Cognitive Networks

Program	Academic Master's Degree	Professional Master's Degree
Curriculum	Focusing primarily on "theoretical deepening + methodological training," with an emphasis on offering advanced theoretical courses.	Adhering to the concept of "case-driven + practice-oriented," closely integrated with industry realities.
Teaching modes	With the support of cognitive networks, a "MOOC + online workshop" model is adopted.	Conduct scenario simulation teaching based on a dynamic case library relying on cognitive networks.
Mentoring	Led by mentors, following the logic of "problem-driven - literature critique - hypothesis verification."	Implementing a "dual mentor system," where on-campus mentors are responsible for strengthening theoretical foundations, while off-campus mentors guide practical applications.
Learning methods	Use bibliometric tools to conduct visual analysis of massive amounts of literature and quickly grasp the hot topics and cutting-edge developments in the field.	Through cross-disciplinary collaboration platforms and interaction with dual mentors, participate in practical activities such as case studies and real-world business projects.
Evaluation system	Focus on academic papers and research projects as core indicators.	Patent applications and industry solutions are important evaluation criteria.
Outcome-oriented	Emphasize the theoretical	Focus on the practical application

	value of academic achievements, demonstrating research capabilities and teamwork through high-quality academic papers and research project outcomes.	of research outcomes, leveraging concrete application results to bridge the gap between technology and the market, thereby demonstrating professional expertise and practical value.

5.Cognitive Network-Guided Classification and Collaborative Innovation Strategies for Master's Degree Students

5.1 Academic Education: Building a "Theoretical Cognition-Academic Innovation" Double Helix

First, develop an intelligent "disciplinary knowledge map" system. Using big data and artificial intelligence technologies, organize and integrate the vast amount of knowledge within a disciplinary field to develop a "systematic, comprehensive, and dynamically updated" disciplinary knowledge map. This map not only includes the theoretical framework, basic concepts, and research methods of the discipline but also tracks academic frontiers in real time, such as the latest research findings, academic controversies, and hot topics. Second, establish a "cognitive scaffolding" training system. Cognitive scaffolding is a new teaching method that provides master's students with step-by-step guidance and support to help them gradually understand and master complex knowledge and skills. During the academic master's degree program, teachers should construct cognitive scaffolding of different levels for students based on their learning progress and research stage. When formulating research plans, teachers can guide students in determining research questions, objectives, and methods to help them develop scientific research plans. During the specific research process, teachers need to regularly communicate with students to understand their research progress and challenges, and provide timely guidance and suggestions. Third, establish interdisciplinary cognitive collision platforms, such as "interdisciplinary workshops," to break through the cognitive limitations of a single discipline. In the context of interdisciplinary integration, many key academic issues require the comprehensive application of knowledge from multiple disciplines to be resolved. Through "interdisciplinary workshops," students and faculty from different disciplinary backgrounds can gather to share and exchange research methods, ideas, and results; In this process, students can gain exposure to theoretical knowledge and ways of thinking from various disciplines, significantly broadening their academic horizons and stimulating innovative thinking.

5.2 Professional Education: Creating a "Career Awareness—Practical Application" Closed Loop

First, construct an "industry awareness map." Through in-depth research and analysis of the industry, map out the industry's industrial chain, and analyze information such as core technologies, key links, competitive landscape, and market demand. Based on this, personalized career awareness guidance is provided to students according to the capability requirements of various occupational positions, helping them establish differentiated cognitive development paths. Taking the electronics and information industry as an example, the “industry awareness map” clearly illustrates key stages such as chip design, manufacturing, packaging, and testing, as well as electronic product R&D, production, and sales. Students can align their interests and career plans to choose suitable development directions, such as specializing in chip design and deeply studying and mastering professional knowledge and skills in this field. Through the guidance of the “industry cognitive map,” students can better establish their career goals and strengthen their professional abilities in a targeted manner. Second, build a “virtual practice sandbox.” On this platform, students can simulate real-world professional scenarios and engage in various practical operations and decision-making, including product design, project management, and market promotion. Through virtual practice, students can experiment with various solutions and strategies in a safe environment, accumulate extensive practical experience, and enhance their cognitive decision-making abilities in complex environments. Third, create a “career awareness mentor database.” Invite experts from various fields to serve as mentors, providing students with comprehensive and systematic cognitive empowerment. These experts not only possess rich industry experience but also have a deep understanding of cutting-edge technologies and industry trends; they can provide guidance and advice to students from both micro-level practical skills and macro-level industry perspectives. In terms of micro-level practical skills, experts can share specific operational methods and practical skills based on their own work experience, including how to conduct business negotiations, how to write project reports, and how to solve real-world problems. In terms of macro-level industry perspectives, experts can share information on industry policies, regulations, development trends, and market dynamics, helping students grasp the overall landscape and future direction of the industry.

5.3 Common Optimization: Data-Driven Cognitive Guidance Ecosystem Construction

First, collect a wide range of student cognitive behavior data. Through various channels such as practical teaching platforms, learning management systems, and academic social networks, collect behavioral data on students' course learning, academic research, practical activities, and social interactions, such as learning progress, learning time, performance in practical projects, assignment completion status, and academic paper publication status. This data can fully reflect students' cognitive processes and developmental states, providing important references for subsequent cognitive assessment and guidance. By systematically analyzing this data, one can understand students' learning habits, ability levels, and interest preferences, providing strong support for personalized cognitive guidance. Second, use artificial intelligence technology to achieve precise matching of cognitive guidance resources. By combining students' cognitive behavioral data with their individual needs, and leveraging recommendation systems and machine learning algorithms, personalized learning resources, academic activities, and practical projects can be precisely recommended to students. For example, academic master's students can be recommended academic conference notifications, research project information, and cutting-edge academic papers to help them stay updated on academic trends and actively participate in high-level academic research; professional master's students can be recommended industry reports, professional training courses, and internship opportunities to help them enhance their professional competence. Third, create a “cognitive network community” to provide a platform for academic and professional master's students to interact and achieve complementary cognitive development. In the “cognitive network community,” academic students can share their academic research methods, theoretical research results, and ways of thinking; professional students can share their practical experience, professional skills, and industry cases; Through enhanced interaction and exchange, academic and professional master's students can learn from and inspire one another, further broadening their cognitive horizons.

6.Conclusion

In summary, cognitive networks provide new technological support and development paradigms for the classify cultivation of graduate education. This paper centers on cognitive networks to systematically compare and analyze the current state of academic and professional master's education, deeply revealing the differentiated educational characteristics and development paths of academic and professional master's students under the guidance of cognitive networks. Research findings: Under the guidance of cognitive networks, academic master's education focuses on cultivating theoretical knowledge and scientific research innovation capabilities through academic resource platforms and interdisciplinary databases; professional master's education focuses on practical empowerment and enhancing professional capabilities through virtual simulation platforms and industry-education integration resources. Based on this, this paper proposes strategies for the differentiated cultivation and collaborative innovation of the two: For academic master's students, constructing a “theoretical cognition-academic innovation” double helix can cultivate their academic thinking and innovative capabilities; for professional master's programs, a “professional cognition-practice conversion” closed-loop can be established to enhance their practical application and professional adaptability; data-driven cognitive guidance ecosystem construction provides a cross-disciplinary communication and resource-sharing platform for the collaborative development of academic and professional master's education, helping to bridge the “gap” between theory and practice. In the future, it is essential to continuously improve the efficiency of cognitive network resource allocation, promote the deep integration of technological empowerment and educational principles, and achieve the differentiated and high-quality development of academic and professional master's degree programs, thereby realizing the goal of cultivating high-end talent.

References

Bu, A. (2025). A Course-Based Ideological and Political Education Model and Implementation Pathways for Professional Master’s Degree Students. Journal of the People’s Public Security University of China, 41(6), 86–91.

He, Y., & Wei, B. (2025). A Study on the Cultivation of Critical Thinking among Humanities Academic Master’s Degree Students. Theoretical Observation, (5), 155–160.

Li, B., Pei, Y., & Song, D. (2025). Research on the Pathways for Cultivating Practical Abilities of Professional Degree Postgraduates in the Context of Building an Education Powerhouse. Journal of Henan Institute of Science and Technology,45(6), 58–66.

Lu, L., Gu, X., & Cai, H. (2024). A Study on the Cognitive Network Differences in Teaching Reflection Abilities between Novice and Expert Teachers in Human-computer Collaboration Scenarios. Modern Distance Education, (3), 87–96.

Qiao, Y., & Tao, M. (2024). The Current Status and Countermeasures of Research Problem Awareness among Academic Master’s Degree Students. Journal of Guilin Normal University,38(6), 84–92.