Research on the Innovation and Practical Abilities of Postgraduates in Local Engineering Universities under the Guidance of Ideological and Political Education

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Abstract. With the rapid development of artificial intelligence technology, innovation and practical abilities have become important indicators for measuring the core competitiveness of postgraduates. Currently, in the postgraduate training of local engineering universities, there are common problems: insufficient integration of ideological and political education with knowledge impartment, weak complementarity between innovative ability training and professional learning, and low degree of matching between practical ability training and talent training objectives. These issues have restricted the effective improvement of students' comprehensive abilities. As an important approach to implement the fundamental task of "fostering virtue through education", ideological and political education not only undertakes the mission of value guidance but also subtly stimulates students' sense of responsibility and innovative spirit. Taking the postgraduate training in the field of artificial intelligence at Guangxi University of Science and Technology as an example, this paper explores effective paths to enhance postgraduates' innovation and practical abilities under the guidance of ideological and political education, through strategies such as integrating ideological and political education with curriculum teaching, exploring innovation transformation paths, and promoting engineering training and university-enterprise collaboration.

Keywords: Ideological and political education; Postgraduate education; Innovation and practical abilities; Local engineering universities

1 Introduction

In the Report to the 20th National Congress of the Communist Party of China, General Secretary Xi Jinping profoundly pointed out: "Education, science and technology, and talents are the foundational and strategic supports for building a modern socialist country in all respects." This important assertion has pointed out the direction and provided

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fundamental guidance for the reform of higher education and the development of scientific and technological innovation in the new era. In May 2024, General Secretary Xi Jinping made important instructions on the construction of ideological and political courses in schools, emphasizing the need to continuously promote the development of ideological and political education in the new era and cultivate more new-era talents who can shoulder the responsibility of national rejuvenation, which has pointed out the direction for the construction of ideological and political courses in the new era[1]. Against this strategic background, the reform and innovation of postgraduate training mechanisms in the field of artificial intelligence have increasingly attracted the attention of academic circles[2].

As an important part of China's higher education system, local engineering universities shoulder the dual mission of supporting regional economic development and serving national strategies. Under the overall pattern of giving priority to education development, achieving self-reliance and self-improvement in science and technology, and driving development through talent leadership, exploring a new talent training path with the characteristics of local engineering universities has become an important issue that urgently needs to be solved. Taking the postgraduate training in the field of artificial intelligence at Guangxi University of Science and Technology as an example, this paper explores a postgraduate training model led by ideological and political education. By integrating strategies such as curriculum reform, project practice, and university-enterprise collaboration, it aims to improve postgraduates' innovation and practical abilities, so as to provide useful references for the high-quality development of local engineering universities.

2 Problems And Challenges in the Cultivation of Graduate Students in Artificial Intelligence

Artificial intelligence (AI) has become the core driving force behind the new round of technological revolution and industrial transformation, and also serves as the core competitiveness in the country's future strategy[3]. After years of development, China's AI graduate education has achieved remarkable results, with the continuous expansion of cultivation scale and continuous improvement of cultivation models, providing a large number of high-level applied talents for the construction of socialist modernization. However, in response to the higher requirements put forward in the new era, there remains a certain disconnection between the current graduate education in terms of the structure, quality and level of talent cultivation and the rapid development of industries.

2.1 Inadequate Integration of Ideological and Political Education with Knowledge Imparting

Ideological and political education is a key guarantee for implementing the fundamental task of fostering virtue through education. Against the backdrop of the vigorous development of AI technology, its importance has become increasingly prominent, while it also faces new opportunities and challenges[4]. In the cultivation of graduate students in

the AI field in many local engineering universities, the curriculum system and teaching design still focus on the imparting of professional knowledge and skills. Ideological and political education is often set as independent theoretical courses or thematic lectures, resulting in a lack of organic integration between it and professional courses. Although this model can effectively improve students' technical level, it is difficult to guide them to examine the application and development of AI technology from multiple dimensions such as society, ethics and law.

Specifically, when graduate students engage in in-depth research on professional technologies such as model architecture and algorithm optimization, they generally lack in-depth thinking on the social value, ethical boundaries and legal responsibilities of technology. At the same time, they rarely receive systematic training on value judgment during their participation in scientific research projects. This not only hinders the cultivation of students' professional ethics and public responsibility, but also restricts the safe and credible social application of AI achievements.

An in-depth analysis of its causes mainly includes the following aspects: first, the teaching staff lacks the ability to deeply integrate ideological and political elements with professional knowledge; second, the teaching evaluation system focuses on academic and technical indicators, with insufficient attention to students' comprehensive qualities such as values and ethical literacy; third, there is a lack of ideological and political teaching case databases that are consistent with the characteristics of AI majors and real application scenarios.

2.2 Weak Complementarity between Innovation Ability Cultivation and Professional Learning

Scientific research and innovation are the main characteristics that distinguish graduate education from other educational stages, and also the core driving force for promoting its high-quality development[5]. In the cultivation of AI graduate students in many local engineering universities, the teaching system often focuses on the imparting of classroom knowledge, the reproduction of established experiments and the completion of supervisors' established research topics, failing to systematically construct and strengthen students' innovation ability.

Specifically, since the teaching design does not follow the complete innovation chain of "problem discovery, scheme design, algorithm implementation and achievement output", most students are limited to repetitive experimental verification and engineering implementation tasks, and lack the space for in-depth exploration of open-ended problems, training in interdisciplinary collaboration and independent conduct of exploratory research. In addition, various award and evaluation mechanisms in universities generally focus on course grades and the number of papers as core indicators, failing to give due recognition and support to students' innovative exploration.

The above factors lead to insufficient cultivation of graduate students' innovative thinking and abilities, restricting the full release of their innovative potential. In essence, the root causes lie in the limited investment in teaching resources, the relatively single and rigid research directions of supervisors, and the excessive reliance of the achievement evaluation system on the number of papers.

2.3 Low Alignment between Practical Ability Cultivation and Talent Training Objectives

In the cultivation of AI graduate students in local engineering universities, there is a large gap between the training of engineering practical abilities and the actual needs of the industry[6]. Students' practical links are mostly limited to completing supervisors' research projects or meeting the requirements of graduation internships, failing to deeply engage with and address the complexity of real industrial environments.

The engineering application of AI technology should emphasize abilities in model deployment, maintenance and system integration. However, the cultivation process of graduate students often ends after model verification, resulting in students generally lacking complete project experience in transforming algorithms into stable and usable products. In addition, although university-enterprise cooperation has been carried out, most of it remains at the level of short-term projects or formalization, failing to build a sustainable and in-depth long-term collaborative education mechanism. As a result, valuable industrial experience and cutting-edge needs cannot be effectively fed back into the cultivation process.

This disconnection makes it difficult for graduates to quickly adapt to job positions with high technical requirements and strong systematicness when entering the workplace. To solve this problem, the key lies in promoting in-depth university-enterprise cooperation and integrating engineering project training that is close to industrial realities, thereby effectively bridging the gap between practical ability cultivation and industrial needs.

3 Exploration of the Cultivation Model for the Innovation and Practical Abilities of Graduate Students in Artificial Intelligence

To address the aforementioned problems, this paper intends to reform the graduate training model through approaches such as integrating ideological and political education with curriculum teaching, exploring innovation transformation paths, and promoting engineering training and university-enterprise collaboration. The aim is to construct a cultivation path for the innovation and practical abilities of AI graduate students that serves national major strategic needs.

3.1 Effectively Integrating Ideological and Political Education with Curriculum Teaching to Cultivate AI Talents with Social Responsibility

Ideological and political education in universities is an important channel for implementing the fundamental task of fostering virtue through education, and it is crucial for improving students' comprehensive qualities. In recent years, many domestic universities have carried out extensive and in-depth explorations in this field[7]. Against this background, the AI graduate education in local engineering universities, which undertakes the specific mission of cultivating high-level applied talents to serve national

major strategic needs, must further integrate ideological and political education deeply into the curriculum system.

To achieve the training goal of equal emphasis on technical competence and value shaping, it is necessary to ensure that graduate students not only master cutting-edge professional knowledge but also establish correct scientific and technological ethics and strengthen social responsibility. For this reason, curriculum teaching should focus on effectively embedding ideological and political elements into the process of professional knowledge imparting, thereby realizing the deep integration of ideological guidance and professional learning.

3.1.1 Curriculum Design.

Students are the center of teaching activities, and curriculum design should fully value their learning experience and cognitive development to effectively promote their all-round growth. On this premise, one of the core teaching objectives is to guide students to maintain an open mind and cultivate their ability to discover and define complex problems through observation, thinking and dialectical analysis[8].

It is suggested to systematically embed ideological and political teaching modules into core AI courses such as "Neural Networks and Machine Learning", "Deep Learning Project Practice", and "Computer Vision". These modules should not only explain technical principles but also strive to guide students to examine the social value and ethical responsibility behind technology. Specific contents can include AI ethics and laws and regulations, case analysis of the social impact of technological applications, and technical responsibility issues closely related to industrial policies.

3.1.2 Construction of Case Databases.

Efforts should be made to build a number of ideological and political teaching case databases that integrate local characteristics and industry needs. For example, "Visual Inspection Systems for Local Small and Medium-sized Enterprises: Ethical and Privacy Assessment" and "Application of AI in Smart Agriculture and Analysis of Its Impact on Labor Force". Such cases derived from real local industries can effectively train students' ability to conduct social impact assessment and value judgment.

3.1.3 Innovation of Teaching Methods.

Vigorously promote problem-based learning and discussion-based teaching, with the core of stimulating students' active exploration and in-depth critical thinking in class, so as to lay a solid foundation for their critical thinking and social responsibility. Teaching practice should be closely combined with the disciplinary characteristics of AI, and transform the traditional single model of "teacher lecture - student acceptance".

Through diversified forms such as case studies, group collaboration, role-playing and ethical debates, students can be placed in real or highly simulated technical ethical dilemmas and social decision-making scenarios. In the process of solving problems, they can realize the synchronous development of knowledge construction and value shaping.

3.1.4 Optimization of Evaluation Mechanisms.

In the assessment of AI professional courses, two indicators - "social impact assessment" and "ethical compliance review" - should be added and incorporated into the overall course score. This measure aims to put value orientation into practice, form a teaching closed loop, and ensure that the cultivation of social responsibility runs through the entire process of talent training.

3.2 Promoting Innovation from "Problem Discovery" to "Achievement Transformation"

Faced with the accelerated advancement of the new round of technological revolution and industrial transformation, the national strategic layout is in urgent need of a large number of top-notch talents with both innovation ability and feelings of family and country[9]. For this reason, local engineering universities should construct a systematic innovation training path for graduate students in the AI field. The goal is to improve their independent scientific research and interdisciplinary collaborative innovation capabilities, promote the emergence of scientific research achievements, and ultimately realize the full-chain innovation from "problem discovery" to "achievement transformation"[10]. Specific implementation requires multiple measures, including project-based teaching, interdisciplinary collaboration, innovation incentives, and industry-university-research docking, to build a sound ecological system conducive to innovation incubation and achievement transformation.

3.2.1 Implement Project-Based Teaching and Open-Ended Research Topic-Driven Models.

Introduce open tasks from practical applications into curriculum and scientific research training, and guide students to independently complete the entire process from scheme design to practical verification in groups. The supervisor's role transforms from a task assigner to a guide, mainly providing framework-based guidance. This measure aims to stimulate students' innovative thinking and cultivate their independent scientific research capabilities[11, 12].

3.2.2 Establish an Interdisciplinary Joint Training Mechanism.

Interdisciplinary integration is an important source of innovation. Actively promote collaborative research between AI graduate students and students from different disciplinary backgrounds such as mathematics, medicine, and civil engineering. Provide strong guarantees for interdisciplinary integration through systems such as setting up interdisciplinary elective credits. This mechanism aims to break down disciplinary barriers and cultivate students' comprehensive ability to examine and solve complex problems from multiple perspectives.

3.2.3 Improve the Innovation Incentive Mechanism.

Establish a "Graduate Student Innovation Fund" and "Innovation Credits", provide start-up funding support for promising excellent projects, and give priority to recommending them to participate in university-level achievement exhibitions and industry docking activities. This measure can not only effectively enhance students' internal motivation for innovation but also strengthen the connection between their scientific research activities and actual industrial needs.

3.2.4 Construct an Achievement Incubation and Industry-University-Research Docking Platform.

Provide full-chain support for graduate student projects with market prospects, from technology development and enterprise incubation to technology transfer. At the same time, establish stable cooperative relationships with local small and medium-sized enterprises: enterprises provide real technical needs and application scenarios, while universities organize research teams to conduct targeted research. This in-depth collaborative model can accelerate the transformation and application of scientific research achievements.

3.2.5 Improve the Academic Support System.

To effectively reduce the resistance for students from idea generation to achievement implementation, provide full-process academic support covering scheme design, algorithm optimization, and academic paper writing. This system aims to remove technical obstacles in the scientific research process and lay a foundation for students' academic growth and high-level achievement output.

3.3 Constructing a Systematic Engineering Training Chain and a Long-Term University-Enterprise Collaborative Mechanism

Practical teaching is an important part of the teaching system in local engineering universities. It is not only related to the coordinated development of students' knowledge, abilities and qualities but also directly determines their future job competence and career development potential[13]. To achieve this goal, it is necessary to construct a systematic engineering training chain throughout the entire cultivation process and establish a stable collaborative education mechanism with enterprises.

This enables graduate students to fully experience the entire engineering transformation process from algorithm models to usable systems in a real engineering environment, thereby solidly mastering core engineering capabilities such as system deployment, operation and maintenance, and team collaboration. Through this mechanism, students can not only master theoretical knowledge but also hone their ability to solve complex engineering problems in practical projects.

3.3.1 Design an Engineering Training Path Throughout the Entire Cultivation Process.

In the graduate training program, systematically design an engineering training path that runs through curriculum learning, research projects and enterprise practice. Through university-enterprise co-constructed practical courses, joint laboratories and long-term project cooperation, continuously inject real enterprise needs and cutting-edge technological trends into the teaching process[14]. By assuming different roles and completing phased tasks in this path, students can understand the transformation process from scientific research exploration to industrial application. This measure aims to improve students' engineering literacy and job adaptability, and effectively bridge the gap between school and career.

3.3.2 Establish a Long-Term University-Enterprise Collaborative Education Platform Based on Long-Term Projects.

Sign long-term strategic cooperation agreements with relevant enterprises in the region. Enterprises provide real data, engineering problems and practical scenarios as the project foundation, supporting graduate students to lead or deeply participate in the entire process from prototype development and algorithm optimization to product iteration. To ensure the quality of training, the contribution and achievement level of graduate students in the projects are incorporated into the credit recognition and score evaluation system[15]. This in-depth cooperation based on real projects can not only temper students' engineering practical abilities but also enable them to accumulate valuable experience meeting industry needs.

4 Conclusions

The cultivation model of graduate students' innovation and practical abilities under the guidance of ideological and political education can effectively promote the innovation of talent cultivation in local engineering universities in the new era. By integrating ideological and political education, innovation ability cultivation and engineering practice, graduate students in artificial intelligence (AI) from local engineering universities will not only possess solid technical capabilities but also demonstrate strong comprehensive qualities in terms of social responsibility, ethical judgment, team collaboration and other aspects. The exploration of this cultivation model provides a talent cultivation path that meets national strategic needs for local engineering universities.

Future research can focus on two important directions: first, construct a supporting multi-evaluation system to scientifically and comprehensively evaluate the growth of graduate students in dimensions such as social responsibility, innovative thinking and engineering practice; second, deeply explore the reshaping mechanism of supervisors' roles, and promote their transformation from the traditional "academic authority" to a composite role of "value guide, innovation collaborator and practice navigator". Through continuous exploration in the above-mentioned fields, it is expected to cultivate more scientific and technological talents with both feelings of family and country, innovative spirit and practical ability.

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References

1. Q. Liang, B. Sun. The value orientation and practical path of Xi Jinping's cultural thought shaping the new pattern of education in the “Great Ideological and Political Course”[J]. Academic Journal of Zhongzhou, 2025, (2): 14-20.
2. W. Dai, M. Xu, X. Liu, et al. Exploration and practice for cultivation mechanism of professional degree postgraduates from artificial intelligence interdiscipline: Taking China University of Mining and Technology as an example[J]. Control Engineering of China, 2025, 32(1): 185-192.
3. J. Wei, R. Shang, W. Zhang, et al. Thoughts and practices on the construction of curriculum ideology and politics in postgraduate courses of artificial intelligence[J]. Computer Education, 2024, (12): 94-98.
4. Y. Yang. Several pairs of relationships to be handled well in ideological and political education empowered by artificial intelligence[J]. Ideological and Political Education Research, 2025, 41(1): 137-145.
5. Y. Ma, Y. Yu. Innovative choices for high-quality development of graduate education in the era of digital intelligence[J]. Tsinghua Journal of Education, 2025, 46(1): 40-47.
6. F. Huang, X. Liu, H. Wu, et al. Exploration and practice of the training mode for practical and innovative abilities of professional degree postgraduates[J]. Academic Degrees & Graduate Education, 2024, (4): 23-29.
7. J. Lin, B. Wang, Z. Niu, et al. Paths for the innovative integration of ideological and political education and applied talent training mode[J]. Journal of Liaoning Open University, 2022, (4): 9-12.
8. H. He, Y. Chen, Y. Lu. Problems and countermeasures in the construction of curriculum ideology and politics for journalism and communication majors in local universities of technology[J]. Journal of Changchun Education Institute, 2023, 39(6): 57-61.
9. Z. Liang, Y. Lu, Y. Ai. Research and practice on the cultivation of interdisciplinary innovative talents for postgraduates relying on major scientific and technological infrastructure[J]. China University Teaching, 2024, (3): 18-24.
10. J. Han, N. Liu, F. Wang. Graduate students’ perceived supervisor support and innovative behavior in research: The mediation effect of creative self-efficacy[J]. Frontiers in Psychology, 2022, 13: 875266.
11. Q. Li, X. Du, H. Chen, et al. How can graduate students’ research pressure be transformed into motivation and innovative behavior? The role of graduate students’ mentorship homegate (or team) support[J]. Frontiers in Psychology, 2025, 15: 1439478.

12. Y. Wan, Z. Guo. Complex management countermeasures of postgraduate education quality based on comparison of international training models[J]. Complexity, 2022, 1: 8014975.
13. L. Tang, K. Wei, Y. Xu, et al. Methods and paths for practical teaching reform in local universities of technology[J]. China Higher Education, 2023, (Z2): 74-76.
14. A. Vuoriainen, P. Rikala, V. Heilala, et al. The six C's of successful higher education-industry collaboration in engineering education: a systematic literature review[J]. European Journal of Engineering Education, 2025, 50(1): 26-50.
15. N. Utaberta, B. Hassanpour. Aligning assessment with learning outcomes[J]. Procedia-Social and Behavioral Sciences, 2012, 60: 228-235.