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# Reform and Practice of Talent Training Mode for Artificial Intelligence Major in Universities Under the Background of New Engineering

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**Abstract:** Under the background of the continuous advancement of new engineering construction, the rapid development of the artificial intelligence industry has put forward higher requirements for talent training in colleges and universities. At present, there are many problems in the training of artificial intelligence professionals in colleges and universities, which cannot meet the needs of the industry and the goals of new engineering construction. Guided by the new engineering concepts of "integration of industry and education, cross-border integration", this paper adopts the method of combining literature research and practical analysis to confirm the practical significance of the reform of the talent training mode for artificial intelligence majors, comprehensively analyzes the four major difficulties of interdisciplinary integration, industry-education collaboration, faculty reserve, and practical resources, and puts forward targeted reform approaches including curriculum system construction, deepening of industry-education mechanism, faculty team building, and upgrading of practical conditions. Specific practical cases are used to improve the implementation methods. The research results provide operational references for colleges and universities to improve the talent training mode and quality of artificial intelligence majors, and boost the high-quality development of the artificial intelligence industry.

**Keywords:** New engineering; Colleges and universities; Artificial intelligence; Talent training; Reform and practice

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## 1. Introduction

Driven by a new round of scientific and technological revolution and industrial transformation, new engineering construction has become the main direction of engineering education reform in China, aiming to cultivate innovative engineering and technological talents that meet the needs of the industry. As a key field of new engineering, artificial intelligence is characterized by rapid technological renewal and diverse application scenarios, which promote the transformation and upgrading of the industry, but also generate a strong demand for compound and practical talents. Although the artificial intelligence major in Chinese colleges and universities has developed rapidly, there are still prominent problems, such as unclear training objectives, outdated curriculum system, shallow integration of industry and education, and lack of practical platforms,

resulting in the disconnection between talent training and enterprise needs. Against this background, guided by the new engineering concepts of "integration of industry and education, cross-border integration", exploring the reform path of the talent training mode for artificial intelligence majors in colleges and universities and solving the contradiction between talent supply and demand has become an important topic to promote the high-quality development of the artificial intelligence industry and implement the tasks of new engineering construction [1].

## 2. Practical significance of the reform and practice of talent training mode for artificial intelligence majors in colleges and universities under the background of new engineering

Under the background of new engineering, the innovation and implementation of the talent training mode for artificial intelligence majors in colleges and universities have irreplaceable epochal and practical values. From the perspective of industrial development, the reform and practice can accurately connect the rapidly updating talent needs of the artificial intelligence industry, solve the current problems of disconnection between theory and practice and lack of compound talents in talent training, cultivate professional talents with innovative thinking, practical ability and cross-border ability for industrial transformation and upgrading, and lay a solid foundation for the high-quality development of the artificial intelligence industry. From the perspective of higher education, this is a measure to implement the essence of "integration of industry and education, cross-border integration, innovation leadership" in new engineering construction, which can promote colleges and universities to improve the training system of artificial intelligence majors, update teaching content, innovate teaching mode, achieve the connotative development of engineering education, and improve the quality of major construction and school-running level. From the national strategic level, relying on the innovation of talent training mode, we can continuously cultivate high-quality artificial intelligence professionals, help China occupy a commanding height of talents in the global artificial intelligence technology competition, provide strong talent support for the construction of a country with strong science and technology and a digital China, and promote the realization of independent innovation and sustainable development in the field of artificial intelligence in China [2].

## 3. Practical difficulties in the reform of talent training mode for artificial intelligence majors in colleges and universities under the background of new engineering

### 3.1. Barriers to interdisciplinary integration need to be broken urgently

Artificial intelligence is a typical interdisciplinary subject, and its talent training needs to integrate the knowledge of computer, mathematics, statistics, engineering and many other disciplines. However, most colleges and universities still adopt the traditional discipline division, and there are obvious barriers between disciplines. Each discipline is managed by different departments, with independent teaching plans and curriculum settings, and there is no systematic interdisciplinary curriculum system design, making it difficult for students to form a complete interdisciplinary knowledge framework [3]. The unbalanced allocation of disciplinary resources, insufficient integration of teaching and research resources in cross-disciplinary fields, and the lack of cross-disciplinary teaching ability of teachers cannot well guide students to achieve the integration of multi-disciplinary knowledge, affecting the cultivation of compound artificial intelligence talents.

### 3.2. The mechanism of industry-education collaborative education is not perfect

Industry-education collaboration is the main way of new engineering talent training, but the current collaborative education between colleges and enterprises is still in a shallow cooperation stage, lacking a long-term and stable cooperation mechanism. Enterprises are not highly motivated to participate in talent training, mostly staying in the superficial forms of providing internship positions and donating equipment, and do not participate in the determination of training objectives, curriculum development, teaching implementation and other links. There are different interest demands between colleges and universities. Colleges and universities attach importance to the systematicness and fundamentality of talent training, while enterprises attach importance to the post-adaptability and immediate availability of talents. The lack of an effective collaborative docking mechanism between the two parties results in the disconnection between training content and the actual needs of enterprises, and the effect of collaborative education is greatly reduced [4].

### 3.3. The reserve of high-quality faculty is relatively short

High-quality faculty is the guarantee of the reform of the talent training mode. At present, the problems of insufficient quantity, unbalanced structure and weak practical ability of the faculty of artificial intelligence majors in colleges and universities are prominent. Some teachers are transferred from computer, mathematics and other majors, lacking systematic professional training in artificial intelligence, and have a shallow understanding of cutting-edge technologies and industrial dynamics. The proportion of "double-qualified" teachers with enterprise practice experience is low. Most teachers have been engaged in theoretical teaching and scientific research for a long time, lacking engineering practice ability, and cannot carry out practical teaching and project guidance well. At the same time, it is difficult for colleges and universities to attract top talent in the industry and core technical personnel of enterprises, and the overall level of the faculty cannot meet the requirements of new engineering talent training [5].

### 3.4. The allocation of practical teaching resources is unbalanced

Practical teaching is a key link in the training of artificial intelligence professionals. At present, the allocation of practical teaching resources in colleges and universities is obviously unbalanced. Regionally, colleges and universities in the eastern developed regions can obtain more enterprise resources and financial support by virtue of their industrial advantages, with complete practical platforms and advanced equipment. Colleges and universities in the central and western regions are limited by region and funds, with slow renewal of practical equipment and a lack of high-level training platforms [6]. On campus, practical teaching resources are mainly concentrated in some advantageous departments. The allocation of practical resources in different development directions of artificial intelligence majors is unbalanced, with more basic practical resources, but insufficient innovative and comprehensive practical resources, facing the forefront of the industry, which cannot meet the diverse needs of students.

## 4. Practical paths for the reform of talent training mode for artificial intelligence majors in colleges and universities under the background of new engineering

### 4.1. Build an interdisciplinary curriculum system and reshape the knowledge structure

Proceeding from the interdisciplinary attribute of artificial intelligence, teachers should take the lead in sorting out the connection points of multi-disciplinary knowledge, break through the barriers of traditional disciplinary

courses, and create a modular and systematic interdisciplinary curriculum system. Optimize the setting of curriculum modules according to the training requirements of new engineering talents, organically integrate the knowledge of basic disciplines such as computer, mathematics and statistics with the core technologies of artificial intelligence and the knowledge of application scenarios, and clarify the teaching focus and connection relationship of each module. Innovate curriculum teaching methods, and adopt interdisciplinary thematic teaching, project-based teaching and other means to enable students to achieve the integration of multi-disciplinary knowledge, help students reshape the knowledge structure that meets the development needs of the artificial intelligence field, and improve interdisciplinary application ability. Dynamically update curriculum content, keep up with the forefront of disciplines and industrial needs on time, and ensure the scientificity and timeliness of the curriculum system [7].

For example, in the project of "Construction of Interdisciplinary Curriculum System for Artificial Intelligence", teachers should take the lead in organizing teachers from computer, mathematics, automation and other departments to form an interdisciplinary teaching team, comprehensively sort out the main connection points between each discipline and artificial intelligence, divide it into three modules: basic theory, core technology and cross-application according to the main purpose of new engineering talent training, and clarify the connection logic, teaching duration and assessment standards between the courses of each module. Combined with the cutting-edge trends of disciplines and the actual needs of the industry, organically integrate the main contents of artificial intelligence such as machine learning, data mining and deep learning with multi-disciplinary knowledge such as mathematical modeling, engineering optimization and control theory, create a series of interdisciplinary thematic courses, update course handouts, syllabuses and courseware resources at the same time, add cutting-edge technical cases and practical application scenario analysis, regularly carry out interdisciplinary teaching exchange activities, quickly update curriculum content and teaching methods, ensure that the curriculum system not only has solid basic theories, but also meets the needs of industrial development, promote students to form a complete interdisciplinary knowledge structure, and improve interdisciplinary thinking and comprehensive application ability.

## 4.2. Deepen the industry-education integration mechanism and co-construct an education platform

Teachers should take the initiative to act as a bridge, promote colleges and universities and industry enterprises to form a deep-seated collaborative education mechanism, organize and coordinate the needs of enterprises, and participate in the creation of a co-constructed education platform. Actively participate in the development of school-enterprise cooperation courses, integrate the core technologies and post needs of enterprises into teaching content, improve teaching plans, and achieve precise docking between teaching and the actual post needs of enterprises. Take the lead in building platforms such as school-enterprise joint training and scientific research innovation, promote the sharing of teaching resources and enterprise resources, encourage enterprise technical personnel to go deep into the teaching process, and jointly carry out teaching implementation and project guidance. Establish a school-enterprise collaborative teaching evaluation mechanism, jointly formulate talent training evaluation standards with enterprises, track students' learning and practice in the whole process, continuously improve the collaborative education mode, and enhance the education effect [8].

For example, in the project of "School-Enterprise Co-construction of Artificial Intelligence Education Platform", teachers should take the initiative to contact local leading artificial intelligence enterprises, investigate the post needs and technology development trends of enterprises, lead enterprises to sign school-

enterprise collaborative education agreements, clarify the responsibilities and division of labor of each party in talent training, and establish a normalized communication and docking channel. Form a curriculum development team with enterprise technical backbones, sort out the core skill requirements of posts, develop school-enterprise cooperation courses that meet the needs of enterprises, integrate the actual project cases, technical standards, and industry norms of enterprises into the course teaching content, improve the design of teaching plans and training links, and clarify the specific requirements and assessment standards of practical teaching. Take the lead in building a school-enterprise joint training base, coordinate enterprises to provide advanced training equipment, technical support and project resources, orderly arrange students to participate in the research and development of real enterprise projects in stages, invite enterprise technical personnel to the school to carry out special lectures, project guidance and technical training, establish a school-enterprise collaborative evaluation mechanism, comprehensively control students' learning and practical results, timely improve teaching content and training plans, achieve precise docking between teaching and enterprise post needs, and strengthen students' post adaptability.

### 4.3. Introduce and cultivate a high-level faculty team and strengthen team support

Teachers should take the initiative to participate in their own capacity improvement activities, participate in cutting-edge technical training, interdisciplinary teaching seminars and enterprise practice exercises in the field of artificial intelligence, make up for their professional deficiencies, and improve interdisciplinary teaching ability and engineering practice ability. Take the lead in establishing a faculty training platform, organize on-campus teaching and research exchanges, off-campus study and research, etc., to promote teachers to exchange experience and improve together. Actively participate in talent introduction work, assist in introducing top talents in the industry and core technical personnel of enterprises according to the needs of major construction, and improve the structure of the faculty team. Establish a faculty assessment and incentive mechanism, including interdisciplinary teaching, school-enterprise cooperation, practical teaching, etc., to mobilize teachers' enthusiasm and initiative to participate in talent training reform [9].

In the project of high-level faculty team construction for artificial intelligence, teachers should formulate a scientific and reasonable faculty training plan, carry out artificial intelligence cutting-edge technology seminars, interdisciplinary teaching seminars and academic exchange activities for on-campus teachers according to their professional characteristics and capacity gaps, contact top universities in the industry, arrange teachers to go out for study and research, dock with cooperative enterprises, arrange teachers to take on-the-job practice in enterprises in a planned way, actively participate in enterprise project research and development, accumulate engineering practice experience, and improve teachers' engineering practice ability and interdisciplinary teaching level. Take the initiative to contact top universities and leading enterprises in the industry, sort out talent introduction needs, assist the school in formulating preferential policies, introduce industry-leading talents and enterprise core technical personnel, and improve the educational background structure, professional title structure and practice structure of the faculty team. Take the lead in formulating detailed and complete faculty assessment and incentive implementation rules, incorporate interdisciplinary teaching achievements, school-enterprise cooperation contributions, practical teaching effects, scientific research and innovation capabilities into the assessment index system, clarify assessment standards and reward and punishment methods, mobilize teachers' enthusiasm and initiative to participate in talent training reform, and improve the overall quality of the faculty team.

### 4.4. Upgrade practical teaching conditions and promote resource sharing

According to the needs of practical teaching of artificial intelligence majors, teachers should take the lead in sorting out the deficiencies of practical teaching resources, put forward plans for improving practical teaching conditions, and promote the renewal of practical teaching equipment and the construction of training platforms. Optimize the allocation of practical teaching resources, coordinate the practical teaching resources of artificial intelligence majors among various colleges in the school, and coordinate the practical teaching resources of other majors. Innovate the practical teaching organization mode, scientifically plan the content and process of practical teaching, promote basic practice, comprehensive practice and innovative practice teaching in layers, and meet the different practical needs of students. Establish a practical teaching resource management system, attach importance to the maintenance and rational utilization of practical teaching resources, take the lead in building a practical resource sharing platform, promote the mutual exchange and mutual benefit of practical resources between colleges and universities inside and outside the region, and between schools and enterprises, and improve the utilization rate of practical teaching resources [10].

Taking the project of "Upgrading and Sharing of Artificial Intelligence Practical Teaching Resources" as an example, teachers should take the lead in setting up a practical teaching research group, conduct a comprehensive investigation on the current situation of practical teaching resources of the major, adopt questionnaire surveys, teacher-student seminars, enterprise visits and other methods to find out the deficiencies in practical equipment, training platforms, project resources and other aspects, formulate a scientific and feasible plan for improving practical teaching conditions according to the development direction of artificial intelligence majors and students' practical needs, strive for school financial support, update artificial intelligence training equipment, build intelligent simulation training platforms and innovative practice bases, and improve the hardware facilities of practical teaching. Take the lead in integrating practical resources of computer, automation, electronic information and other departments in the school, break the resource barriers between departments, establish a unified practical resource management system, clarify the scope of resource sharing, use process and management responsibilities, and realize the mutual sharing of practical resources between artificial intelligence majors and related majors. At the same time, take the lead in building a regional college practical resource sharing platform, coordinate colleges and enterprises in the region to share training equipment, project resources and teaching resources, formulate unified resource sharing management norms and charging standards, establish a resource maintenance and update system, improve the utilization rate of practical teaching resources, and meet the diverse practical needs of students.

## 5. Conclusion

To sum up, this paper mainly studies the reform and practice of the talent training mode for artificial intelligence majors in colleges and universities under the background of new engineering, analyzes the epochal and practical significance of the reform and practice of the talent training mode for artificial intelligence majors in colleges and universities under the background of new engineering, analyzes the main problems existing in four aspects: interdisciplinary integration, industry-education collaborative education, high-quality faculty reserve, and practical resource allocation, and puts forward specific solutions from four aspects: establishing an interdisciplinary curriculum system, strengthening the industry-education integration mechanism, introducing and cultivating a high-level faculty team, and improving practical teaching conditions. The implementation methods of each path are improved through practical cases, which provide

referential practical references for colleges and universities to implement the requirements of new engineering construction, solve the pain points of talent training, and improve the quality of talent training, and help the high-quality development of the artificial intelligence industry and the construction of a country with strong science and technology.

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## Disclosure statement

The authors declare no conflict of interest.

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