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Exploring the Reform Path of Artificial Intelligence General Education Courses for Non-Computer Science Majors

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Abstract: Against the backdrop of a new round of technological revolution and industrial transformation, artificial intelligence technology has become a core competency for modern citizens and a key ability for non-computer science students to enhance employability and adapt to industrial upgrading demands. Current AI general education courses for non-computer majors suffer from issues such as rigid knowledge systems, monotonous teaching methods, lack of practical components, and insufficient interdisciplinary integration, making it difficult to meet the needs of talent cultivation and societal development. This paper proposes reform pathways from four aspects—curriculum system reconstruction, teaching model innovation, faculty development, and practical platform construction—to establish an AI general education system tailored for non-computer majors, aiming to cultivate cross-disciplinary talents with AI collaborative capabilities.

Keywords: Non-computer Science Major; Artificial Intelligence General Education Courses; Curriculum Reform; Talent Cultivation

1. Introduction

With the continuous rapid iteration and upgrading of cutting-edge artificial intelligence technologies such as DeepSeek and ChatGPT, as well as innovative technologies in key fields such as autonomous driving and intelligent healthcare, they have been widely popularized and applied in many scenarios. Artificial intelligence technology has successfully broken through the limitations of laboratory environments, moving from theoretical research to the forefront of industrial practice, demonstrating strong application potential and value on the front line of the industry, and becoming a key force in promoting the transformation and upgrading of various industries. Therefore, artificial intelligence technology is increasingly becoming one of the universal technologies that various professions must master.

The general course of artificial intelligence is the core carrier for non computer major students to learn AI knowledge, which is related to the quality of talent cultivation. However, many universities still use traditional teaching logic, which has problems such as "abstract and difficult to understand content, disconnection from professional needs, and weak practical links", seriously affecting teaching effectiveness. Based on the existing artificial intelligence curriculum system and the unique knowledge foundation and professional needs of non computer major students, a new training system that adapts to the needs of the times and student development should be constructed, integrating diversified teaching content. the systematic promotion of artificial intelligence general education curriculum reform has become an important issue in higher education reform [6]. This article will explore feasible reform paths in depth, providing reference for the high-quality development of general education in artificial intelligence for non computer majors in universities

2. Reform Path of Artificial Intelligence General Education Course for Non Computer Majors

In response to the knowledge foundation and professional needs of non computer major students, it is necessary to carry out a "four-

dimensional collaborative" artificial intelligence general education course teaching reform, as shown in ***Figure 1***. In terms of the curriculum system, we will create a modular structure of "universal+distinctive+integrated", popularize AI concepts and tools through universal basic modules, achieve precise integration of "AI+X" through professional characteristic modules, cultivate innovative thinking through interdisciplinary integration modules, and dynamically optimize content based on local industries and industry characteristics. In terms of teaching mode, a diversified system of "theory+case+practice+project" is adopted, with popularized teaching to lower the learning threshold, case driven to enhance immersion, layered practice to adapt to different professional abilities, and project-based teaching to enhance teamwork and problem-solving abilities. In terms of faculty development, a "interdisciplinary+dual teacher" team will be formed to strengthen the interdisciplinary teaching ability and practical experience of teachers through cross departmental collaboration, systematic training, and the introduction of external resources. On the practical platform, a three-dimensional training system of "on campus+off campus+online" is constructed, relying on on on on campus laboratories, off campus practice bases, and online resources to provide students with full scenario practice opportunities and cultivate compound talents who possess both technical application ability and professional integration thinking.

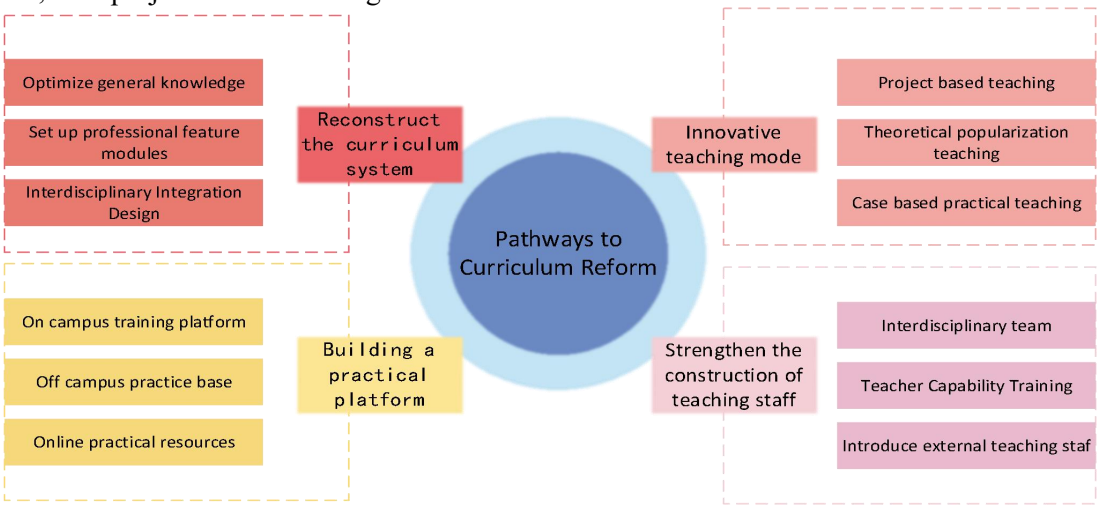

Figure 1. A four-Dimensional Collaborative Teaching Reform System

2.1 Refactoring the Curriculum System: Constructing a Modular Curriculum Structure of "Universal+Distinctive+Integrated"

The curriculum system is the foundation of talent cultivation, and the primary task of reform is to build a modular curriculum system that is based on the characteristics of non computer major students and combines "general+characteristic+integration".

(1) Set up universal basic modules to solidify the fundamental knowledge of artificial intelligence. For all non computer major students, in order to facilitate the establishment of a basic understanding of artificial intelligence, different from computer majors that focus on algorithms and underlying technical logic, when teaching non computer major students, emphasis should be placed on concepts, tools, and applications. the teaching content should avoid excessive specialization, technicality, and abstraction, and should explain the core concepts, development process, technological framework, technological applications, and social impact of artificial intelligence in easy to understand language and vivid examples. Specifically, it can include "Introduction to Artificial Intelligence", "Overview of Core Artificial Intelligence Technologies", "Fundamentals of Artificial Intelligence Tools", etc., focusing on the basic concepts and application scenarios of key technologies such as machine learning, deep learning, and natural language processing, as well as the usage methods of commonly used AI tools such as ChatGPT, DeepSeek, and Doubao. In specific teaching, algorithm details and formula derivation should be reduced, and emphasis should be placed on technical applications and scenario interpretation to ensure

that students from different majors and backgrounds can understand and master them.

(2) Set up specialized modules to achieve precise alignment with professional needs.

Based on the characteristics of non computer major students' disciplines, design teaching content that meets professional targeting and reflects the integration orientation of "artificial intelligence+X". the characteristic modules of each major can be jointly developed by relevant teachers in their respective majors and computer science teachers to ensure the integration and professionalism of the content.

For engineering majors such as mining, machinery, electrical engineering, and civil engineering, we can focus on explaining the application of artificial intelligence in intelligent mining, intelligent manufacturing, intelligent monitoring, intelligent construction, and other fields based on their professional backgrounds. We can introduce relevant cases and practical projects such as industrial robots and intelligent sensors. For medical professionals, we can focus on the application of artificial intelligence in assisting diagnosis, drug development, health management, and other scenarios, and embed AI technology to carry out practical applications such as intelligent analysis of medical images and intelligent interpretation of medical records. When explaining humanities majors such as literature, history, and law, the focus can be on the practical application of natural language processing technology in deep text analysis and digital protection of cultural heritage. At the same time, the application of digital information in diverse practical scenarios, as well as important issues of social concern such as artificial intelligence ethics and algorithmic fairness, can be explored. For art majors, it is important to focus on cutting-edge fields such as AI painting, AI music creation, and virtual digital humans, and explore innovative creative paths that integrate art and technology and promote collaborative coexistence.

(3) Set up interdisciplinary integration modules to cultivate students' innovative practical abilities.

In order to guide students to adopt a multidisciplinary perspective and flexibly apply artificial intelligence technology to overcome the numerous challenges in complex engineering fields, it is necessary to combine practical problems, break down disciplinary barriers, and design interdisciplinary teaching content and practical projects.

For students majoring in art, history, and other fields, an interdisciplinary module called "AI+Ethnic Culture Protection" can be set up to use AI image generation technology to restore traditional clothing and patterns, and natural language processing technology to organize ancient literature. For students majoring in management, law, and other fields, a module on "Artificial Intelligence and Social Governance" can be offered, which can integrate knowledge from disciplines such as law, sociology, and computer science to explore the application and risk prevention of artificial intelligence in urban management, public safety, and other areas.

In addition, regional characteristic cases can be introduced based on the demand of local leading industries, and artificial intelligence application scenarios in regional characteristic industries can be integrated into the curriculum. Coastal universities can focus on increasing the application of artificial intelligence in fields such as port logistics and marine economy, such as optimizing cargo loading and unloading scheduling and efficiently exploring marine resources; Industry characteristic universities can introduce targeted artificial intelligence projects in the transformation of industry intelligence and upgrading of characteristic industries, such as quality inspection and production process optimization in manufacturing, crop growth monitoring and precision irrigation in agriculture. This can effectively enhance the practicality and adaptability of the course, and help students effectively apply theory to practice.

It is worth noting that artificial intelligence technology is advancing rapidly, and the curriculum system should have a dynamic optimization mechanism. Regularly track the forefront of artificial intelligence technology development and changes in industry demand, update course content, and supplement new technologies, scenarios, and cases. At the same time, establish a student feedback mechanism, collect students' opinions and suggestions on the course content through questionnaires, symposiums and other forms, adjust the course module and teaching content in a timely manner, and ensure the progressiveness and applicability of the course.

2.2 Innovative Teaching Mode: Constructing a Diversified Teaching System of "Popularization of Theory+Cases+Practice+Projects"

Due to the lack of theoretical foundation in artificial intelligence among non computer major students, the traditional "cramming" theoretical teaching mode is abandoned, and a diversified teaching system of "popular teaching+case demonstration+practical operation+project driven" is constructed to create a teaching environment suitable for non computer major students and improve learning effectiveness.

(1) Adopting a simplified theoretical teaching method.

Teaching related theories should avoid delving into complex formula derivation and technical details. Instead, abstract concepts can be simplified through analogies and visual demonstrations, such as using "brain neuron connections" to simulate neural network principles and demonstrating machine learning model training through animation. In addition, online resources such as MOOCs and micro courses can be utilized to provide students with independent learning channels. Students can flexibly arrange their learning progress based on their own foundation, while offline classes focus on answering questions and interactive discussions, achieving an organic combination of online and offline blended learning.

(2) Strengthen case-based teaching.

Build a dynamic case library, collect and organize artificial intelligence application cases from different fields, classify and archive them by profession, and facilitate teacher teaching and student learning.

Combining the actual teaching situation of different majors, selecting cases from students' daily life practice or professional fields, and integrating abstract theoretical knowledge into specific scenarios to enhance the fun and immersion of the course. For example, for students majoring in economics and management, the case of "Application of Artificial Intelligence in E-commerce Precision Marketing" can be introduced to deeply analyze the construction of user profiles and the implementation logic of product recommendation algorithms. For students majoring in education, a case study on the application of intelligent teaching assistant systems in teaching will be presented to explore the transformative impact of artificial intelligence on educational and teaching models.

(3) Enrich the practical operation process.

In the teaching design of artificial intelligence courses for non computer major students, targeted teaching can be carried out based on the characteristics of different majors and students' ability levels. Layered practical activities can be designed, including the foundation layer, improvement layer, and innovation layer.

The foundational layer focuses on the basic operations of artificial intelligence tools and is mainly aimed at students majoring in grammar, arts, and sports. For this group of students with relatively weak technical foundations, cloud based training platforms and other technological means can be used to effectively reduce the threshold for practical operation, allowing students to experience the application process of artificial intelligence technology in practice and solidify their basic skills.

The improvement layer focuses on the cultivation of technical application and scheme design abilities, which is suitable for the knowledge structure and ability development needs of students majoring in economics and management, while also meeting the advanced learning and development needs of students with spare capacity in grammar, arts, and sports majors. In teaching, open source platforms such as Baidu PaddlePaddle and Tencent AI Lab can be used to guide students to carry out simple small project practices such as image recognition and text classification, and improve their ability to solve practical problems using AI technology.

The innovation layer stimulates students' innovative thinking and creativity, encouraging them to independently design original practical projects based on their own professional needs, which is more suitable for students in general engineering majors. For example, students can be organized to use AI data analysis tools (such as Tableau, Power BI combined with AI plugins) to process professional domain data for deep processing and analysis, and generate data analysis reports with professional value, thereby cultivating students' innovative practical ability and professional literacy.

(4) Promote project driven teaching.

Organizing students to conduct interdisciplinary project research through group collaboration can not only cultivate teamwork spirit, but also enhance their comprehensive problem-solving abilities in dealing with complex problems. To

implement project-based teaching, it is necessary to adhere to the educational philosophy driven by real problems and design project cases based on practical development needs. For example, by setting up the "Campus Intelligent Service System Design" project, professional barriers can be broken down, allowing students from computer science, management, design and other majors to form teams to jointly complete tasks such as requirement research, scheme design, prototype development, etc., helping them understand diverse professional thinking and skills, and learn to analyze and solve problems from multiple perspectives.

In addition, the "Artificial Intelligence+Professional Innovation" project can be launched to encourage students to focus on their respective professional pain points, explore innovative solutions using artificial intelligence technology, and integrate technology with professional knowledge to propose improvement strategies. During the implementation of the project, teachers track and guide the entire process, provide professional advice and technical support, regularly organize reporting and communication activities, build a platform for students to showcase and share, and cultivate their project management and communication skills.

2.3 Strengthening the Construction of Teaching Staff: Creating an Interdisciplinary and Dual Qualified Teaching Staff

The construction of teaching staff is the key to curriculum reform. In response to the teaching needs of non computer major students in artificial intelligence knowledge system and the goal of cultivating their innovation ability, it is necessary to build a "interdisciplinary+dual teacher" teaching team with interdisciplinary teaching ability and rich practical experience through various means. It can provide solid and powerful teacher support for artificial intelligence teaching for non computer major students, and promote the in-depth development and innovative breakthroughs of curriculum reform.

(1) Establish an interdisciplinary teaching team.

Based on the needs of the curriculum, break down departmental barriers, integrate multiple forces such as computer science teachers, other professional backbone teachers, and enterprise technical experts, and form interdisciplinary teaching teams. At the same time, establish an interdisciplinary teaching and research system mechanism, regularly carry out course research and development activities such as teaching seminars, case co creation, and course joint development, and enhance the team's collaborative teaching ability.

When teaching non computer related courses, it is crucial to establish a scientific and reasonable teacher collaboration model, which requires clear division of labor and collaborative promotion based on the strengths of teachers with different professional backgrounds. Computer science teachers are responsible for explaining the basic theories and technical frameworks of artificial intelligence; Other professional teachers combine the characteristics of their respective majors to explain the application scenarios and practical cases of artificial intelligence in their professional fields, helping students understand the integration path of artificial intelligence technology with their respective majors; Enterprise technology experts can share their experience in industrial applications of artificial intelligence technology and the latest developments in the field, enabling students to stay up-to-date with cutting-edge industry information and broaden their horizons.

Taking the case study of "artificial intelligence+healthcare" as an example, computer science teachers explain in detail the underlying principles of medical image recognition technology, allowing students to understand how artificial intelligence achieves analysis and judgment of medical images; Medical professional teachers, starting from clinical practical needs, elaborate on the application value and urgent needs of medical image recognition technology in disease diagnosis, treatment plan formulation, and other aspects, so that students can realize the close connection between this technology and medical practice; Enterprise experts will introduce the entire process of related products from research and development, testing to final implementation and application, including technical difficulties encountered, solutions, and market feedback, so that students can understand the actual situation of artificial intelligence technology in industrial transformation. Through such division of labor and cooperation, a comprehensive, three-dimensional, and in-depth knowledge system can be presented to students, effectively improving teaching effectiveness.

(2) Strengthen teacher training and enhance their abilities.

Due to the rapid iteration of artificial intelligence technology and significant differences in subject application environments, a systematic teacher training system should be established to enhance teachers' artificial intelligence literacy and interdisciplinary teaching abilities. Regularly organize course group teachers to conduct training on artificial intelligence knowledge and teaching methods.

The training content should be comprehensive, covering core artificial intelligence technologies (such as machine learning), commonly used teaching tools (such as teaching platforms, programming software), interdisciplinary course design methods, and practical teaching organization skills, helping teachers master cutting-edge knowledge, efficient teaching, break down disciplinary barriers, and enhance practical guidance abilities.

The training methods should be diverse, and online courses should be flexible and convenient for teachers to learn independently; Offline workshops focus on interactive practice, deepening knowledge understanding and application; Academic exchange activities provide a platform for exchanging ideas with experts and understanding industry trends; Corporate secondment training allows teachers to accumulate practical experience in the industry and integrate it into teaching.

In addition, teachers are encouraged to apply for interdisciplinary teaching and research projects, collaborate with enterprise personnel in research and development, drive teaching ability improvement through projects, integrate practical results into the classroom, and improve teaching quality.

(3) Introduce high-quality external teaching resources.

To further improve the teaching staff, external teachers will be introduced through various means to enhance the practicality and cutting-edge nature of the teaching process. Often, by hiring industry experts and enterprise technical backbone as part-time teachers, they can focus on undertaking teaching tasks in practical teaching, such as guiding students' practical projects, conducting skill training, etc., to make up for the shortcomings of on campus practical guidance. Renowned scholars in the field of artificial intelligence can also be regularly invited to give special lectures, which can help students understand the cutting-edge dynamics and development trends of artificial intelligence technology and broaden their knowledge horizons.

At the same time, virtual teaching and research platforms can be used to break geographical limitations, strengthen teacher exchanges and cooperation with domestic and foreign universities, share high-quality teaching resources and experience, and jointly promote the improvement of teaching level.

2.4 Building a Practical Platform: Constructing a Three-Dimensional Practical Training System of "On Campus+Off Campus+Online"

Adequate practical platforms are an important support for enhancing students' application and innovation abilities. Given the rapid development and complex technical system of artificial intelligence technology, it is difficult for schools to quickly establish practical platforms with strong effectiveness. Therefore, it is necessary to integrate internal and external resources, build a three-dimensional practical training system of "on campus training+off campus practice+online platform", and provide students with comprehensive practical opportunities.

(1) Build an intelligent training base on campus.

Increase investment in curriculum construction and establish an artificial intelligence basic general education training base that integrates teaching, experimentation, and scientific research. This base can be equipped with low code development platforms, artificial intelligence experimental equipment, data collection and analysis tools, and other resources. At the same time, develop targeted training materials and guidance manuals, clarify training objectives, content, steps, and evaluation standards, and standardize the training teaching process. For example, building a cloud based artificial intelligence training platform to support students in remotely conducting practical tasks such as model training and data processing; Build an AI creative space to provide students with a venue and equipment support for conducting interdisciplinary innovation projects, such as 3D printers, smart sensors, virtual reality devices, etc.

(2) Expand off campus practical cooperation bases.

In order to provide students with a real industrial practice environment, schools should actively expand external cooperation channels, establish deep cooperative relationships with technology enterprises, industry associations, research institutes, etc., and jointly build off campus practice bases. By arranging students to enter the R&D department of enterprises, they can understand the complete process from theoretical conception to technology implementation. By entering the application department to participate in actual project operations, students can intuitively see how artificial intelligence technology can play a role in specific business scenarios, quickly familiarize themselves with industrial application processes, accumulate experience in solving practical problems, and enhance their practical application abilities of technology. By collaborating with research institutes to carry out scientific research training projects, we guide students to participate in research projects related to artificial intelligence and cultivate their research abilities.

(3) Create an online practical teaching platform.

Integrate high-quality online resources through various channels, establish online practical teaching platforms and project exchange platforms, encourage students to share practical achievements and experiences, promote mutual learning and communication among students, and enhance their practical application abilities. the platform can introduce high-quality artificial intelligence related MOOC resources from well-known universities at home and abroad, especially course practice videos, which can visually display technical application operations and provide students with diverse learning choices. Virtual simulation experiment projects can also be developed to allow students to experience practical operations in complex scenarios in a virtual environment, reducing practical risks and costs. At the same time, the platform should have an intelligent teaching assistant system to provide personalized practical guidance and Q&A services for students, and timely solve problems encountered by students in the practical process.

3. Conclusion

In order to promote the reform of general courses on artificial intelligence for non computer majors, based on students' knowledge foundation and professional characteristics, this article elaborates on the corresponding reform path from four aspects: constructing a modular curriculum system of "general+characteristic+integration", innovating a diversified teaching mode of "theoretical popularization+case+practice+project", creating a "cross disciplinary+dual teacher" teaching team, and building a three-dimensional practical training system of "on campus+off campus+online". Through these reform measures, it is possible to effectively enhance the knowledge reserve, practical ability, and comprehensive literacy of non computer major students in artificial intelligence, and cultivate composite talents with cross disciplinary integration and innovation capabilities.

With the continuous iteration of artificial intelligence technology and the deepening of education reform, the reform of general courses on artificial intelligence for non computer majors still needs to be continuously deepened. Colleges and universities should closely monitor the development of technology and the dynamic changes in industrial demand, continuously optimize the curriculum system and teaching content, innovate teaching methods and means, improve the level of the teaching staff, ensure that curriculum reform always adapts to the development of the times and the ability needs of students, and cultivate more high-quality talents that are suitable for the era of artificial intelligence.

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