# Design of Embedded Interdisciplinary Educational Program: A Case Study-based on an AI Certification Program

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## Abstract

**Background:** Accompanied by the breakthrough progress of AI technology and its wide application in various industries, the worldwide demand for AI talents is growing explosively, and more and more non-AI majors are eager to learn the basic knowledge and application skills of AI. However, worldwide research and practice of AI education are still in the exploratory stage and face the reality of shortage and dispersion of AI educational resources. How to design AI interdisciplinary program is an urgent problem in the field of engineering education.

**Purpose:** This study took an ongoing and successful AI interdisciplinary certification program as research object, and deconstructed the whole process of the program' s design, implementation, and operation from three dimensions of vision, teaching, and support to summarize its successful experience in the AI talents cultivation and interdisciplinary education.

**Method:** Adopting an exploratory case study methodology, we conducted semi-structured interviews with 5 instructors and professors involved in this program, and collected 10 documented materials about the program from internal channels, official websites, and mainstream media to ensure the authenticity, richness, and completeness of the qualitative data.

**Results:** This program reflects an embedded interdisciplinary educational program design scheme. On the one hand, the program satisfies the personalized learning needs of interdisciplinary students by designing a modular curriculum structure. On the other hand, open teaching platform plays an important role in supporting program operation, which solves the problem of dispersed interdisciplinary educational resources and effectively integrates AI educational resources from different disciplines and subjects.

**Conclusion:** This study has two main contributions. Firstly, we provided a reference instructional design scheme for AI educational program, which fills the current shortage of research in AI education. Secondly, the research results also contribute to the field of interdisciplinary engineering education by providing empirical experience for embedded interdisciplinary educational program design.



***Keywords: Artificial Intelligence Education; Non-AI Majors; Interdisciplinary Educational Program***


## 1 Introduction

The breakthrough progress of Artificial Intelligence (AI) and its widespread application in modern society have attracted global attention. According to a survey by the Organization for Economic Co-operation and Development [1], over 60 countries have implemented more than 1000 policy initiatives specifically aimed at the advancement and regulation of AI. Among them, many nations have positioned AI education at the forefront of their AI development strategies [2]. Taking China as an example, the Chinese government proposes to improve the AI education system and regards AI talents as the top priority of China's AI strategy [3]. However, AI education worldwide is still in its early days [4]. Although the concept of AI was first proposed in Dartmouth in 1956, it was not until the fall of 2018 that Carnegie Mellon University launched the first AI undergraduate degree program in the U.S. Facing the global shortage of AI talents [5], how to cultivate AI talents is an urgent practical problem in the field of engineering education.

AI is a typical interdisciplinary field, which is an enabling technology similar to the combustion engine or electricity [6], and has already shown great application prospects in many industries such as automated driving, bio-medicine, and finance. As a result, more and more students from different disciplinary backgrounds are eager to learn basic AI knowledge and skills to cope with the challenges of the AI era, while AI education resources are scarce and limited. For example, the current shortage of AI talents makes it difficult to recruit qualified and professional AI teachers [7]. At the same time, AI educational resources is more dispersed, with enterprises owning the datasets, arithmetic power, and practical training scenarios needed for student learning, and education resources produced from the private sector, such as textbooks and learning software, are rapidly flooding into classrooms [8]. Therefore, universities need to design more flexible and open AI educational programs to integrate resources from multiple subjects and satisfy the AI learning needs of students from various disciplines.

Therefore, this study adopted a case study method and selected an ongoing and effective AI interdisciplinary certification program as the research object. Guided by a conceptual framework of interdisciplinary engineering education, we deconstructed the design scheme of the program from three dimensions: vision, teaching, and support, and summarized the successful experience of the program in promoting AI talent cultivation. Based on the empirical findings, we will discuss the implications of this program for interdisciplinary engineering education research and practice.

## 2 Literature Review

### 2.1 Artificial Intelligence Education

Artificial Intelligence Education is an interdisciplinary research field, and existing research can be roughly divided into two categories. One stream is AI in Education (AIEd), which focuses on the application of AI in the education contexts [9-10]. For example, utilizing AI to promote personalized learning [11]. Another stream is AI for Education, which aim to

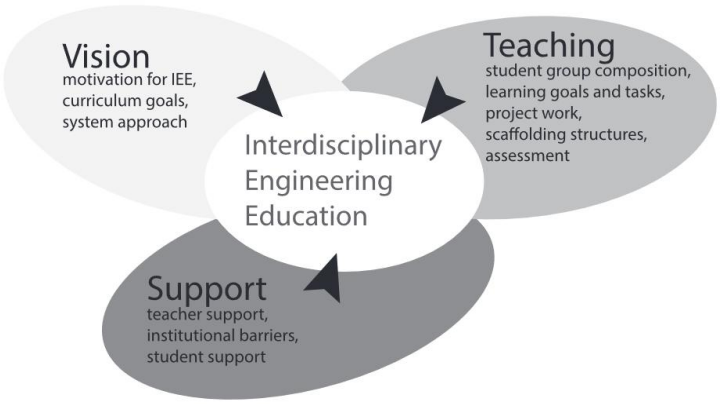
cultivate AI talents to meet the needs of technological progress and industrial development. In terms of research heat, studies focused on AI in Education noticeably outnumber those in AI for Education. However, in policy initiatives, the emphasis on AI for Education holds an overwhelming position, with global policymakers increasingly emphasizing the cultivation of AI talents through education [2], which aroused our research interest in AI for Education, especially in the cultivation of AI talents in higher education. Because there have been many studies addressing issues such as AI curriculum design [12] and collaborative construction [7] in the K-12 stage, and few studies have provided practical solutions for the cultivation of AI talents in higher education. And the few studies on AI talent cultivation at the higher education level are dominated by case studies of AI degree programs [13-15]. However, as mentioned earlier, there is a severe global shortage of AI talents, which can be divided into various types, including not only AI experts who promote breakthroughs in underlying technologies of AI, but also AI professionals who promote the application of AI industry. Furthermore, due to the disruptive changes brought by AI to various industries, AI has developed into a literacy [16], and a large number of non-AI major students have also raised basic AI learning needs. How to meet the learning needs of students with interdisciplinary backgrounds in AI? It clearly requires designing more flexible interdisciplinary educational program.

### 2.2 Design of Interdisciplinary Educational Program

As human society faces increasingly complex and diverse problems, interdisciplinary has become an important trend in the development of higher education [17]. Universities have established various forms of interdisciplinary educational programs to cultivate students' interdisciplinary abilities. However, the successful implementation of interdisciplinary educational programs is not an easy task, and previous scholars have questioned whether interdisciplinary teaching really works [18]. A successful interdisciplinary program requires careful design, and many studies have attempted to provide theoretical guidance for interdisciplinary education design. For example, Klaassen conducted a descriptive case analysis based on two interdisciplinary educational program design models, induction and abduction, and believed that problem orientation is the guiding principle for interdisciplinary education design and implementation [19]. Borrego et al. analyzed how to achieve interdisciplinary education through organizational change in higher education [20]. And Saunders et al. provided 11 tips for interdisciplinary short course design for new graduate students majoring in life sciences [21]. It can be seen that most of these studies provide guidance for interdisciplinary educational program design from specific entry points such as organizational institutionalization, curriculum design, and program implementation, while Van Den Beemt et al. took a more comprehensive perspective and systematically review existing interdisciplinary engineering education research, proposing a conceptual framework for interdisciplinary engineering education programs [22]. This framework divides the process of designing and implementing interdisciplinary educational programs into three key levels: vision, teaching, and support, providing guidance for the research and practice of interdisciplinary educational programs. Overall, we decided to draw on this conceptual framework to guide our case study. Specifically, this study conducted a descriptive case study

on an ongoing AI interdisciplinary certification program to summarize its successful experience in AI education and interdisciplinary program design.

**Figure 1** Conceptual Framework of Interdisciplinary Engineering Education




*Source: Van Den Beemt, A., MacLeod, M., Van Der Veen, J., Van De Ven, A., Van Baalen, S., Klaassen, R., & Boon, M. (2020). Interdisciplinary engineering education: A review of vision, teaching, and support. Journal of Engineering Education, 109(3), 508–555. https://doi.org/10.1002/jee.20347*

## 3 Research Design

### 3.1 Method

The goal of this study is to address the issue of "how" to design interdisciplinary AI educational programs, and the related research is still in the exploratory stage. Therefore, this study adopted a cross-sectional case study of a primarily qualitative and interpretative nature [23]. We collected qualitative information through investigation, official websites, and other channels, and analyzed the design of interdisciplinary program that emerged from the case study from bottom to top.

### 3.2 Case Selection

This study selected an ongoing AI interdisciplinary certification program as research object for the following reasons. Firstly, this program is aimed at undergraduate and graduate students from different disciplinary backgrounds to train their basic AI knowledge and skills. It is a typical interdisciplinary educational program, which is highly compatible with our research questions. Secondly, this program is China' s first inter-university cooperative minor program, with a novel educational model and good operational performance. The first batch of students participating in the program have graduated, and many courses offered by the program have won honors such as national quality courses, all of which represent the case is typical and successful. Thirdly, we have reliable internal channels for obtaining the case materials, thus the authenticity and richness of the data are high.

### 3.3 Data Collection

We collected data through the following ways. Firstly, investigation. We conducted semi-structured interviews with 5 instructors and professors participating in this program. Two of them were the instructors, while the other three were not only responsible for teaching but also directly involved in the program design process. They have a comprehensive understanding of the program' s design, implementation, and operation process. Secondly, other document materials. On the one hand, the authors are members of the "National Science and Technology Innovation 2030- New Generation Artificial Intelligence Science and Education Platform" funded by the Ministry of Science and Technology of China. Multiple members of the project have directly participated in this interdisciplinary AI certification program. Therefore, we have the opportunity to obtain some internal information, such as curriculum structure, faculty list and so on. On the other hand, we have extensively collected public reports on the program published on official websites and mainstream media. A total of 10 documents were collected through the above two channels at last. Based on these, relevant data forms a triangular validation to ensure the authenticity, richness, and completeness of the data.

## 4 Case Analysis

The full name of this AI interdisciplinary certification program is "Minor in AI and Interdisciplinary Curriculum", which is initiated by six renowned universities in the Yangtze River Delta region of China (Zhejiang University, Fudan University, University of Science and Technology of China, Shanghai Jiao Tong University, Nanjing University, and Tongji University). The program is aimed at undergraduate and graduate students of the six universities who are not majoring in Artificial Intelligence, Computer Science or Software Engineering, and focuses on training students to master the core knowledge and practical application capabilities of AI. Students who complete the required credits within the specified time and pass the exam will receive a certification and credits recognized by the six universities. This is China's first micro-minor educational program that is built across universities and recognized by each other, and it is also a typical case of Chinese universities exploring the cultivation of AI talents.

### 4.1 Vision

Vision serves as a foundation for an interdisciplinary program by describing the basic motivations and goals that are to govern an educational program, and refer to the why of an interdisciplinary program [22]. At the macro level, the establishment of this program is guided and driven by national policy. In recent years, the Chinese government has attached great importance to the cultivation of AI talents. In 2017, the Chinese State Council released the *New Generation Artificial Intelligence Development Plan of China*, which made an overall plan for the development of AI in China, with AI talents as the top priority. In 2018, the Chinese Ministry of Education issued the *Action Plan for Artificial Intelligence Innovation in Higher Education Institutions*, proposing that universities should improve their

AI talent cultivation system. In 2020, the Chinese Ministry of Education and other departments once again issued relevant documents requiring universities to accelerate the strengthening of graduate cultivation in the field of AI and strengthen China' s AI talent team. A series of policy documents that have been continuously issued indicate the Chinese government' s emphasis and demand for AI talents, and particularly emphasize that universities should take action to promote AI education. Therefore, in order to satisfy the policy needs, six universities jointly established this AI certification program, with the mission of promoting the construction of China' s AI talent cultivation ecosystem and cultivating talents for China to seize the advantage in AI development.

At the micro level, the program was established to promote interdisciplinary and meet the AI learning needs of students from different disciplinary backgrounds. As mentioned earlier, AI is an enabling technology that has caused disruptive changes to many industries and fields, and more and more students from different disciplinary backgrounds want to master AI knowledge and technology to meet the challenges of the AI era. And the establishment of this program quickly received an enthusiastic response from the students. The initial quota limit for the program was 300 people, while it attracted over 2000 students to sign up when it first opened. Therefore, in order to meet the learning needs of a large number of students from interdisciplinary backgrounds, this program aims to provide learners with a flexible course structure and innovative teaching methods, enabling them to have a comprehensive understanding of the basic knowledge and practical application ability of AI, and adapt to the development trends of new technologies, new formats, new models, and new industries in the era of AI.

> *I think AI has now become a general ability, or can be called digital literacy. On the one hand, we have found that many students from other disciplines are very interested in AI. On the other hand, they are in great need of AI, because in their field, AI has gradually become an important tool (Instructor, W).*

### 4.2 Teaching

Teaching responds to the how and what questions by putting the governing vision into action, which includes learning goals, pedagogies, assessment and so on [22]. Curriculum design is the core of this AI certification program and also a major challenge facing in current AI education.

> *Personally speaking, I believe the cultivation of AI talents can be divided into two types: students who are already majoring in AI and students who have never studied AI. Currently, how to educate students who have never learned AI is a challenge. Because the curriculum system for AI majors is relatively mature, while AI education for non-AI majors is mostly in an undeveloped state (Instructor, X).*

Due to significant differences in academic backgrounds, mathematical foundations, and other aspects among participating students, the program adopts a highly flexible modular

curriculum, which includes six parts. First, Introduction Courses. This part is ready for formal learning, mainly including programming basis, data structure and algorithm design. This module is not required, and students can flexibly choose it according to their own knowledge base before formal learning.

**Table 1** Curriculum Structure of Introduction Courses

| Course Module | Course Name | Teaching Institution | Credits |
|---|---|---|---|
| **Introduction Courses** | Data Structures | ZJU | 0 |
| | Introduction to Programming with C | ZJU | 0 |
| | Python Programming | ZJU | 0 |
| | Object-Oriented Programming with Java | ZJU | 0 |
| | AI Frameworks | ZJU | 0 |

*(*Note: The Teaching Institution names in the Table 1 to Table 6 use abbreviations: Zhejiang University, ZJU; Fudan University, FDU; Shanghai Jiao Tong University, SJTU; Nanjing University, NJU; University of Science and Technology of China,USTC; Tongji University, TONGJI; Harbin Institute of Technology, HIT; Shanghai University of Finance and Economics, SUFE; Chinese Academy of Sciences, CAS)*

Second, Foundation Courses. This part is divided into three categories: Artificial Intelligence and Machine Learning, Programming Framework, and Frontier Lectures, which help students to better grasp the basic theory system of AI and the hot topics in the field. The minimum number of credits required for the Foundation Courses is 6, with at least 2 credits in each of the above three categories.

**Table 2** Curriculum Structure of Foundation Courses

| Course Module | Course Categories | Course Name | Teaching Institution | Credits |
|---|---|---|---|---|
| **Foundation Courses** | AI and Machine Learning | Introduction to AI General Knowledge | ZJU | 2 |
| | | Pattern Recognition and Machine Learning | FDU | 2 |
| | Programming Framework | AI Programming Frameworks | ZJU | 2 |
| | Frontier Lectures | Lecture Series on Frontiers and Applications of AI | / | 2 |

Third, Modular Courses. This part is currently divided into six categories, namely Intelligent Perception and Cognition, Intelligent Systems, Intelligent Design, Intelligent Decision Making, Intelligent Cities, and Robotics, which students can choose according to their own fundamentals and research interests. The minimum credit requirement is 4 credits, and

students are required to choose at least two categories from which to study, and complete at least one course in each category.

**Table 3** Curriculum Structure of Modular Courses

| Course Module | Course Categories | Course Name | Teaching Institution | Credits |
|---|---|---|---|---|
| **Modular Courses** | Intelligent Perception and Cognition | Natural Language Processing | HIT, ZJU | 2 |
| | | Computer Vision | SJTU, ZJU | 2 |
| | | Introduction to Neuroscience | ZJU, USTC | 2 |
| | | Intelligent Speech and Language Interaction | SJTU | 2 |
| | | Digital Image Processing | FDU | 2 |
| | | Virtual Reality | FDU | 2 |
| | Intelligent Systems | AI Chips and Systems | ICT, CAS, ZJU, SJTU | 2 |
| | | AI Algorithms and Systems | ZJU | 2 |
| | | Autonomous Intelligent Unmanned Systems | TJU | 2 |
| | Intelligent Design | Introduction to Visualization | ZJU | 2 |
| | | Design Thinking and Innovation | ZJU | 2 |
| | | AI and Data Design | TJU | 2 |
| | Intelligent Decision Making | Reinforcement Learning | NJU | 2 |
| | | Game Theory | PKU, ZJU, SUFE | 2 |
| | Intelligent Cities | Intelligent Urban Planning | TONGJI | 2 |
| | | Internet of Things (IoT) | TONGJI | 2 |
| | Robotics | Intelligent Robots | TONGJI | 2 |

Fourth, Algorithm Courses. This part is a practical course group, each course is 1 credit, and is offered by Huawei, Baidu, SenseTime, Intel and other famous companies in cooperation with university teachers. Besides, this part is centered on cultivating students' practical training ability, helping students to understand and master the practice and application of AI in industrial scenarios. The minimum credit requirement is 1 credit, which means that students are required to choose at least one course to study and complete relevant practical training.

**Table 4** Curriculum Structure of Algorithm Courses

| Course Module | Course Name | Teaching Institution | Credits |
|---|---|---|---|
| **Algorithm Courses** | Applications of AI and Deep Learning | ZJU, Baidu | 1 |
| | AI Full-Stack Theory and Practice | Huawei | 1 |
| | General Vision Framework: OpenMMLab | SenseTime | 1 |
| | Autonomous Driving Algorithm and Practice | FDU, Dell | 1 |
| | Applications of AI and Edge Computing | Intel | 1 |

Fifth, Interdisciplinary Minor Courses. This part covers a wide range of disciplines in order to build a interdisciplinary system. Students are trained to clarify the inherent logical relationships among different disciplines in their studies and enhance their scientific horizons. Students can choose relevant courses according to their own interests and energies. The minimum credit requirement is 1 credit.

**Table 5** Curriculum Structure of Interdisciplinary Minor Courses

| Course Module | Course Name | Teaching Institution | Credits |
|---|---|---|---|
| **Interdisciplinary Minor Courses** | Intelligent Medicine | TONGJI | 1 |
| | AI + Digital Economy | SJTU | 1 |
| | AI + Pharmacy | ZJU | 1 |
| | AI + Law | ZJU | 1 |
| | Computational Sociology | ZJU | 1 |
| | Intelligent Finance | ZJU | 1 |
| | Intelligent Public Administration | ZJU | 1 |
| | AI Ethics | USTC, ZJU | 1 |
| | Computational Healthcare | ZJU | 1 |
| | AI + Art Design | ZJU | 1 |

*AI is an interdisciplinary field, and in terms of curriculum design, we mainly focus on AI knowledge. At the same time, we will use a certain application scenario from other disciplines as teaching assistance to help students better understand the application of AI and promote interdisciplinary research. In addition, this educational program is relatively flexible, and students can design their own programs according to their interests (Instructor, Y).*

Finally, in order to further enhance the students' AI engineering application and practical ability, the program will organize and invite well-known experts from universities and industries to form the faculty team every summer, and organize students to participate in summer training projects through registration and selection. These projects are centered on scientific and technological innovation and practical application, in order to bridge the academic and industrial boundaries and build a complete knowledge training system.

**Table 6** Curriculum Structure of Offline Practical Training Projects

| Course Module | Course Name | Teaching Institution | Credits |
|---|---|---|---|
| **Offline Practical Training Projects** | Summer Training Project | / | 0 |

In terms of teaching and assessment, as the students participating in the program come from six different universities, it is impossible to gather all students together for teaching and examination. Therefore, the program adopts a more flexible online course format, which includes MOOCs, live broadcast, practical training courses, frontier lectures and so on. Among them, the practical training activities will rely on the teaching platform built by the program to provide students with real datasets and open computing power, and improve their application ability in real scenarios. In addition, the program mainly assesses students' learning performance through online testing, submitting course reports, and completing practical training projects.

> *In the course of AI + law, we will use examples from courts, such as public judgment documents, to inspire students on where AI can be used to assist. Specifically, we will ask students to think about specific scenarios and further abstract questions in the assignments of specific courses. In addition, we will provide students with projects that require them to solve practical problems through programming and designing algorithms, and ultimately achieving the goal of empowering algorithms to solve practical problems (Professor, K).*

### 4.3 Support

Support consists of aspects such as infrastructure and institutional support, including available instruction rooms, learning management systems, and other information and communication technologies [22]. For interdisciplinary educational programs, support is a necessary condition for breaking down disciplinary barriers and integrating interdisciplinary resources. According to statistics, a total of 8 universities, 5 enterprises, more than 40 research groups, and more than 60 experts in AI and interdisciplinary fields participated in this program. How to integrate these teachers from different disciplines, regions, universities, and enterprises? In addition, massive data and sufficient computing power are the basic conditions for conducting AI education and training, while these resources belong to enterprises. In this situation, how can universities integrate dispersed educational resources to

provide practical conditions and scenarios for AI education? In this program, an intelligent open teaching platform (Zhihai MO, https://momodel.cn/) plays an important role in ensuring support and resource integration.

> *University education requires a neutral platform to connect universities and enterprises, and provide teaching on basic AI principles and concepts, rather than just training students for the enterprises' ecosystem (Instructor, W).*

This teaching platform is built by Zhejiang University, focusing on AI talent cultivation, interdisciplinary research, and AI educational ecosystem. This platform is based on the AI programming framework developed by Mindspore, ModelArts, PaddlePaddle and other enterprises, closely combines AI technology and teaching practice scenarios, and has rich open source cases, algorithms, models, data and application scenarios and other AI educational resources. The Mo platform is an important support for the operation of this AI certification program. On the one hand, the MO platform integrates teachers from different disciplines, regions, and enterprises through the construction of open communities, and creates an online teaching space for teachers. On the other hand, the platform also plays a central role in integrating enterprise teaching resources, deploying open data, computing power, and algorithms on the platform, and providing students with real training scenarios.

At present, the program is still in operation, and among the first batch of students participating in the program, 66 students have successfully graduated. According to internal research data, more than 84% of the first batch of graduates will continue to pursue further education, and more than half will pursue majors related to AI. Furthermore, through tracking surveys of some graduating students, it was found that 94% of the surveyed students participated in this interdisciplinary program in preparation for future interdisciplinary research. 40% of the students were motivated to pursue further education, and 20% suggested choosing this program for better employment opportunities. In addition, the students also pointed out that "interest" is one of the important reasons for joining the program. Some students also suggest setting up more interdisciplinary projects, which can not only enhance students' interest in AI and but also help them conduct related interdisciplinary research. In addition, many courses offered by the program have been awarded honors such as National Excellent Courses. According to the director' s plan, the program will further expand its training scope and be open to other universities, industries, and even the whole society in China.

## 5 Discussion

Through a comprehensive analysis of the entire process of design, implementation, and operation of this AI certification program, we found it reflected an embedded interdisciplinary program design scheme. The reason why it is called "embedded" is to distinguish it from interdisciplinary programs which the teaching content itself is interdisciplinary, such as interdisciplinary majors and other degree programs. Specifically, the teaching content of this program is not interdisciplinary, but purely the knowledge and skills

of AI. However, they embed the basic knowledge and skills of AI into the knowledge system of interdisciplinary students through a combination approach, and ultimately achieve interdisciplinary education. This embedded interdisciplinary educational design approach is often used in various minor majors or dual degree programs. During the implementation process, this embedded interdisciplinary program may face two challenges. Firstly, there are significant differences in the disciplinary backgrounds and knowledge foundations of students. How to maximize the satisfaction of the learning needs of students with different disciplinary backgrounds? Secondly, the teaching resources of these programs are dispersed, and how to integrate interdisciplinary resources from different subjects to promote implementation? The second challenge may also be a problem that almost all interdisciplinary programs need to overcome. Based on the results of the case study, we found that the program provides solutions to these issues through curriculum design and platform construction.

On the one hand, designing a modular curriculum structure to meet the personalized learning needs of interdisciplinary students. One of the main characteristics of embedded interdisciplinary educational programs is that students come from different disciplinary backgrounds, which leads to significant differences in learning needs for each student. The modular curriculum structure has greater mobility and flexibility, allowing students to freely assemble and form various course combinations according to their needs, fully meeting the personalized learning needs of students from interdisciplinary backgrounds. At the same time, it requires more careful and sophisticated design and division of course modules. The solution of this program is to establish a hierarchical and classified course structure. Firstly, they classify the courses level according to the difficulty level and set up the introduction courses separately. This design method can not only narrow the knowledge gap between students, but also save learning time and avoid repeated teaching. Secondly, they divide the course modules according to their functions. In particular, introduction courses, foundation courses, and modular courses are used to teach core knowledge in AI. Algorithm courses and offline practical training activities training students' practical application abilities. Interdisciplinary minor courses are designed to stimulate students' interdisciplinary thinking and promote interdisciplinary innovation. Finally, in the core part of the curriculum system, which is the modular course section, they further divide the courses based on the sub domains of AI. This hierarchical and classified design of modular curriculum can not only meet the personalized learning needs of students, but also avoid the risks brought by students freely assembling courses, ensuring that students master basic AI knowledge and skills, thereby realizing the vision of the program.

On the other hand, the program integrates educational resources from different subjects and disciplines by building an open teaching platform, which also provides an important support for the implementation of the program. A common challenge faced by interdisciplinary educational programs is how to integrate resources from different subjects and disciplines. In the past, a common solution was to establish interdisciplinary research centers to cultivate interdisciplinary talents. However, the resources that can be gathered by such entity organizations are limited. And resources can only be scheduled and shares within university.

In the field of AI education, this deficiency is further manifested and amplified. Because the teaching resources such as data, computing power, and algorithms that AI education relies on can only be deployed on online platforms, and at the same time, these resources are mostly controlled by enterprises. In this program, more than 60 experts from AI and interdisciplinary fields are involved, coming from different universities, enterprises and research teams, and it is definitely a challenge to integrate the educational resources. This program addresses these issues by building an open teaching platform. Firstly, this platform provides a public space for teachers and students, which can break through the inherent spatial barriers of entity organizations, making it possible for students from different universities and disciplines to learn online at the same time. In addition, the openness and borderlessness of the platform also provide convenience and greater inclusiveness for integrating the resources of different subjects, thus realizing resource integration on a larger scale and in more dimensions, and solving the problem of dispersed AI educational resources. Finally, the platform creates an environment for deploying AI educational resources, with rich data and available computing power resources to build real practical training environments and interdisciplinary learning scenarios for students. Thus, it promotes students to master basic AI knowledge and skills in different application scenarios, and promotes the cross-fertilization of AI with other disciplines.

## 6 Conclusion

This study adopted an exploratory case study method and took an AI interdisciplinary certification program as the research object. By drawing on a conceptual framework of interdisciplinary engineering education proposed by previous studies, the entire process of design, implementation, and operation of this program is comprehensively analyzed from three dimensions: vision, teaching, and support. And we summarized the successful experience of this program in the design of interdisciplinary educational program. As a result, we found that the program reflects an embedded interdisciplinary educational model that embeds AI knowledge and skills in students from different disciplinary backgrounds. Specifically, the program meets the personalized needs of students from interdisciplinary backgrounds through a modular and assembled curriculum structure design, as well as building an open teaching platform to integrate dispersed AI educational resources. Overall, this study has two main contributions. Firstly, we provided a reference design scheme for AI educational program, which fills the current shortage of research in AI education and attempts to provide practical solutions to alleviate the global shortage of AI talents. Secondly, the research results also contribute to the field of interdisciplinary engineering education. Although this study focuses on the field of AI, we believe that the findings can also provide inspiration for talent cultivation in other engineering fields. Besides, our results provide practical guidelines for embedded interdisciplinary educational program design.

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