

Exploration of Micro-specialty Construction Based on Big Data and AI from the Perspective of Medical and Industrial Integration: A Case Study of Intelligent Technology Aging Application Micro-specialty in Anhui Sanlian University

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Abstract:

With the aggravation of population aging, the demand of the elderly for old-age services is becoming increasingly diversified and personalized, which poses a severe challenge to the traditional old-age service model. In this context, it is particularly important to build a micro-specialty of "intelligent technology suitable for aging application", which combines big data analysis with artificial intelligence technology. Based on the practical exploration Faculty of Modern Health Care Industry College of Anhui Sanlian University in the field of health care industry, this paper deeply analyzes the social background and necessity of micro-specialty construction and expounds in detail how to use big data and artificial intelligence technology to design the content, implement path planning and build the evaluation system of micro-specialty construction. This micro-major trains compound talents who have mastered medicine, engineering and other fields, and have big data analysis and artificial intelligence applications, so as to provide safer, more convenient, and personalized aged care services and provide strong support for the innovation and development of the health care industry.

Keywords: integration of medical workers; AI; big data technology; micro-specialty construction

INTRODUCTION

With the accelerated development of global population aging, the health management and quality of life improvement of the elderly have become the focus of general attention from all walks of life [1]. As a product of the deep integration of medical and engineering technologies, intelligent technology is gradually becoming an important means to solve the aging problem. The micro-specialty construction of "Intelligent Technology Suitable for Aging Application" is aimed at cultivating compound talents who are proficient in both medical knowledge and engineering skills. They will be able to use advanced technologies such as big data and artificial intelligence to design, develop, and apply intelligent technologies to meet the diversified needs of health management and life assistance for the elderly.

The aging application of intelligent technology involves many fields, including but not limited to wearable devices, smart homes, telemedicine, health monitoring and data analysis, etc. These technologies not only rely on the accurate analysis of big data to gain insight into the health trends and demand changes of the elderly, but also provide more personalized and intelligent services for the elderly through intelligent decision-making and optimization algorithms of artificial intelligence technology [2]. The mining and analysis of big data can reveal the potential value of health data of the elderly, while the application of artificial intelligence technology can realize the autonomous learning and intelligent response of intelligent devices, thus significantly improving the quality of life of the elderly, effectively alleviating the shortage of medical resources and realizing the optimal allocation of medical resources.

Combining with the micro-specialty construction of "intelligent technology for aging application", medical workers integrate the superior resources of medicine and engineering technology through interdisciplinary education mode, and cultivate professionals who can deeply understand the needs of the elderly, master advanced technologies such as big data and artificial intelligence, and skillfully integrate them into the development of aging products. These talents will be able to deeply understand the physiological and psychological characteristics of the elderly, master the latest progress in intelligent technology, and apply it to the design and development of products suitable for aging. Through the construction of micro-specialty, we hope to promote the wide application of intelligent technology in the field of health management and life assistance for the elderly, and provide more convenient, safe and effective services for the elderly.

BACKGROUND AND NECESSITY OF MICRO-SPECIALTY CONSTRUCTION

Challenges of an Aging Society

With the arrival of an aging society, the problem of providing for the aged has become increasingly prominent. As of 2024, the latest report of China Statistical Yearbook shows that the population aged 60 and over in China has exceeded 297 million; The

number of people aged 65 and above in China has reached 226.76 million, and the proportion of people aged 65 and above has reached 16.4% of the total population[3-7]. China's aging problem has become increasingly prominent, and the number and proportion of the elderly population are increasing. The elderly's demand for aged care services is diversified and personalized, including health management, life care, spiritual comfort, and so on. The traditional old-age service model has been difficult to meet the needs of the current society, so it is urgent to innovate the old-age service model and improve the intelligence level of the old-age service.

Application of Intelligent Technology in Aged Care Service

With the continuous development of intelligent technology, its application in aged care services is becoming more and more extensive. Such as the Internet of Things, big data, artificial intelligence, etc., to provide more convenient, efficient, and personalized services for the elderly [8-9]. For example, monitor the health status of the elderly through smart wearable devices, and discover and deal with potential health problems in time; Provide a safer and more comfortable living environment for the elderly through the smart home system; Provide professional medical advice and guidance for the elderly through telemedicine consultation. These intelligent services can not only improve the quality of life of the elderly, but also reduce the burden on family members and institutions, and realize the sustainable development of aged care services.

The Needs for Medical and Industrial Integration

An interdisciplinary model combining medicine with engineering, which solves medical problems by means of engineering technology. In the field of aged care services, the combination of medical workers can realize the effective integration of intelligent technology and medical knowledge, and provide more accurate and efficient aged care services for the elderly [10]. Therefore, it is important to meet the challenges of an aging society by training old-age service talents with the ability to combine medical and industrial services [11].

CONTENT OF MICRO-SPECIALTY CONSTRUCTION

Curriculum System Construction

The construction of the curriculum system of micro-specialty should closely meet the market demand, and carefully select 5-10 core courses and 10-20 credits for the specific fields or professional positions focused on micro-specialty. These core courses should originate from interdisciplinary integration, including basic theoretical knowledge and professional knowledge in this field, and paying attention to the cultivation of practical skills [12-15]. Through such a comprehensive and in-depth curriculum, the aim is to cultivate students' professional quality in an all-round way, and focus on improving their core professional ability, so as to ensure that students can quickly adapt to and be competent for relevant professional positions after graduation.

Innovation of Teaching Mode

In the construction of micro-specialty, the core teaching mode of improving students' practical ability and comprehensive quality is formed through enterprise research, real project training and subject competition [16]. Through in-depth enterprise research, students can intuitively grasp the needs of social development, industry and post trends, and lay a solid foundation for career planning. Project training emphasizes practical operation and innovative thinking, solves practical problems through teamwork, and effectively improves students' professional skills and teamwork ability [17]. Subject competition further stimulates students' competitive consciousness and innovative spirit, and promotes the overall improvement of comprehensive quality. These teaching modes complement each other and jointly promote the teaching quality of micro-majors and students' career development to a higher level [18].

Construction of Teaching Staff

The key to the construction of micro-professional teachers lies in building a high-quality, diversified and closely meeting the needs of the industry. By paying equal attention to introduction and training, strengthening interdisciplinary integration, deepening school-enterprise cooperation, improving practice and innovation ability, supplemented by perfect evaluation and incentive mechanism, it is ensured that the teacher team has a profound professional theoretical foundation, rich practical experience and innovation ability, and provides solid talent support for the high-quality development of micro-specialty [19].

Practical Teaching Link

The practical teaching of micro-specialty is the key bridge connecting theory and practice, classroom and workplace. Through enterprise practice training, project-based learning, experimental training courses, subject competitions and innovative and

entrepreneurial activities, students' practical ability, innovative thinking and professional quality are comprehensively cultivated. This link not only emphasizes students' application of knowledge and problem-solving in a real environment, but also pays attention to the improvement of soft skills such as teamwork and project management. In order to ensure the high quality of practical teaching, it is necessary to establish a scientific evaluation system, continuously collect feedback and optimize teaching contents and methods. In a word, practical teaching is an indispensable part of micro-professional education, which is of great significance for improving students' comprehensive ability and employment competitiveness [20].

IMPLEMENTATION PATH OF MICRO-SPECIALTY CONSTRUCTION

Strengthen the Construction of Teaching Staff

The key to the construction of micro-specialty lies in strengthening the construction of teaching staff. By introducing high-level teachers, improving teaching ability, building diversified teams, perfecting evaluation and incentive mechanisms and strengthening teachers' morality and style, teachers' accomplishment can be comprehensively improved, teaching quality and interdisciplinary integration can be promoted, students' practical innovation ability can be enhanced, and the structure of teaching staff can be optimized, thus laying a solid foundation for the development of micro-specialty.

Improve Teaching Facilities and Conditions

Teaching facilities and conditions are important guarantee for the construction of micro-specialty. We should increase investment, optimize software resources, build a practice platform, improve laboratory, training base, improve the construction and management of teaching facilities such as learning environment, and ensure that students can obtain a good learning environment and practice conditions. At the same time, we should strengthen the contact and cooperation with enterprises, communities and other cooperative units to expand students' practical channels and employment opportunities.

Optimize the Curriculum System and Teaching Methods

On the basis of the construction of the curriculum system, we should constantly optimize the curriculum system and teaching methods. The course content and difficulty should be adjusted according to the actual situation and needs of students. At the same time, diversified teaching methods and means, such as case teaching and project-based teaching, should be adopted to stimulate students' interest and enthusiasm [16-18].

Strengthen the Cooperation and Exchange of Production, Education and Research

Industry-university-research cooperation and exchange are important ways to build micro-specialty. The college should strengthen cooperation and exchanges with relevant enterprises and scientific research institutions, jointly carry out scientific research projects and technology research and development, and promote the transformation and application of scientific and technological achievements. At the same time, students can also be organized to participate in various academic conferences, competitions and other activities to improve their academic level and innovative ability [8-10].

CASE ANALYSIS: FACULTY OF MODERN HEALTH CARE INDUSTRY COLLEGE OF ANHUI SANLIAN UNIVERSITY

Introduction of Micro Specialty

Intelligent technology aging application micro-specialty is a new specialty that integrates modern technology and old-age services, which improves the quality of life of the elderly through intelligent means and realizes a healthy, comfortable and safe old-age life. Students of this major need to learn basic medicine, artificial intelligence, information technology and other disciplines, and they also need to have the ability to innovate and solve problems. On the basis of cooperation between schools and cooperative enterprises, relying on Hefei Zhongke Deep Valley Technology Development Co., Ltd., Anhui Sanlian Robot Technology Co., Ltd, And other enterprise platforms, we will jointly train students to engage in intelligent product design and development, system operation and management in the field of wisdom and health care, and master practical operation skills such as nursing, rehabilitation and psychological counseling for the elderly.

Training Objectives

Based on Hefei, serving the life and health industry in Anhui Province, and guided by the post requirements of the intelligent health care industry, the micro-specialty of intelligent technology aging application trains compound application-oriented professionals who not only know the basic theoretical knowledge of healthy old-age care and intelligent application technology, but also have the ability of health care, aging-suitable product design and application, human-computer interaction

practice, interdisciplinary comprehensive literacy, and can engage in technological innovation, product development and health services in the fields of intelligent old-age care, medical care and health.

Requirements for Study

Micro-majors are offered in the autumn semester every year, and the starting time is 2 semesters. The course adopts online, offline, online and offline mixed teaching modes, and the start time is flexibly arranged to avoid conflicts with the professional courses studied. Curriculum assessment combines process evaluation with summative evaluation [21]. The results of micro-professional courses are recorded in student transcripts. If the micro-professional courses fail to pass the examination, they can apply for re-examination, which does not affect all kinds of awards and major graduation qualifications.

Cultivation Objects and Conditions

The micro-major of intelligent technology suitable for aging is mainly enrolled by undergraduate students in Anhui Sanlian University, mainly covering students majoring in artificial intelligence, robot engineering, electrical engineering and intelligent control, nursing, health service and management, rehabilitation therapy, computer science and technology, data science and big data technology, etc. The length of study is one year, and the selection and enrollment are carried out in June every year. The number of students enrolled is 30. The student status of the admitted students remains unchanged. For the admitted students, the original degree professional training plan will remain unchanged. According to the micro-specialty training scheme of intelligent technology suitable for aging application, small-class teaching (practical operation + theoretical teaching) is jointly carried out by school and enterprise teachers.

Courses that need to be studied in the early stage: Fundamentals of Computer Culture, Introduction to Artificial Intelligence, etc.

Credits and Certificates

Before graduation, students will complete the 10 credits stipulated in this training program and issue the "micro-specialty" certificate of intelligent technology suitable for aging applications.

Curriculum

The curriculum of intelligent technology suitable for aging application micro-specialty aims to train students to master medical, engineering and other fields of knowledge, and have the skills of big data analysis and artificial intelligence application. The specific curriculum and teaching process plan are shown in Table 1.

Table 1. Curriculum setting and teaching process schedule of "micro-specialty" for aging application of intelligent technology

Serial number	Curriculum code	Course name	Credit	Zhou Xueshi	Total class hours	Allocation of class hours				Beginning semester	Assessment method	Unit of course commencement	Remarks: Pre-courses to be taken
						Online Class hours		Offline Class hours					
						Theoretical hours	Practical hours	Theoretical hours	Practical hours				
1	XDKY-W-1-02	Intelligent robot and its application	2	2	32	16		8	8	3	Examination	Anhui Sanlian Robot Technology Co., Ltd	[Fundamentals of Computer Culture] [Introduction to Artificial Intelligence]
2	XDKY-W-1-04	Structure and function of human body	2	2	32	16		16		3	Examination	Anhui Sanlian College	Unlimited
3	XDKY-W-1-05	Health care and promotion for the elderly	2	2	32	8			24	3	Examination	Anhui younanshan pension industry co., ltd	Unlimited
4	XDKY-W-1-01	Intelligent sensing and human-computer interaction technology	2	2	32	16		8	8	4	Examination	Hefei zhongke shenggu technology development co., ltd	[Fundamentals of Computer Culture] [Introduction to Artificial Intelligence]
5	XDKY-W-1-03	Development and application of aging products	2	2	32			8	24	4	Examination	Hefei zhongke shenggu technology development co., ltd	[Fundamentals of Computer Culture] [Introduction to Artificial Intelligence]
Subtotal			10		160	56		40	64				

Construction of Teaching Team

The professional teaching team is composed of 17 people from Anhui Sanlian College, Hefei Zhongke Deep Valley Technology Development Co., Ltd., Anhui Sanlian Robot Technology Co., Ltd., Anhui Younanshan Pension Industry Co., Ltd., including 15 master's degrees and 2 undergraduates. There are 11 senior titles and 6 intermediate titles, The structure of learning edge is reasonable.

Curriculum Arrangement Plan for the First Semester of the 2024-2025 School Year

Curriculum

- 1) Total class hours: 96 class hours
- 2) Teaching forms: offline teaching, lectures, research, project practice, competition and online learning
- 3) Original course content:

According to the curriculum arrangement of intelligent technology aging application micro-specialty in the first semester of the 2024-2025 school year, we have made detailed planning and adjustment to ensure that the curriculum content not only meets students' learning needs, but also can effectively connect with follow-up courses, as shown in Table 2.

Table 2. Curriculum arrangement

Serial number	Course name	Total class hours	Beginning semester	Remarks: Pre-courses to be taken
1	Structure and function of human body	32	3	Unlimited
2	Health care and promotion for the elderly	32	3	Unlimited
3	Intelligent robot and its application	32	3	[Fundamentals of Computer Culture] [Introduction to Artificial Intelligence]
Subtotal		96		

Allocation of total class hours (96 class hours)

Under the framework of 96 hours in total, the micro-specialty of intelligent technology aging application has carefully planned diversified curriculum arrangements, and comprehensively improved students' professional quality and practical ability through rich practical activities and theoretical study. The specific development is shown in Table 3.

Table 3. Schedule of course project arrangement

Serial number	Project name	Number of school hours
1	Curriculum arrangement	10 hours
2	Lecture arrangement	16 hours
3	Research arrangement	48 hours
4	Scene training	6 hours
5	Competition arrangement	12 hours
6	Online learning	4 hours

Teaching mode and time arrangement

1) Curriculum

The opening ceremony and three offline teachings are arranged in this classroom teaching, mainly to publicize the teaching mode and training system of intelligent technology suitable for aging application micro-specialty. The specific arrangement table is shown in Table 4.

Table 4. Course schedule

Serial number	Course name	Class hours
1	Opening ceremony	1
2	Structure and function of human body	3
3	Health care and promotion for the elderly	3
4	Intelligent robot and its application	3

2) Lecture arrangements

Invite lecturers with rich experience and professional knowledge to give lectures to ensure the quality and depth of lecture content. See Table 5 for the specific lecture arrangement.

Table 5. Lecture Schedule

Serial number	Subject to be reported	Subordinate unit	Class hours
1	Bamboo Barley Lecture Hall Lecture 23 Health Lecture Hall Opening	The First Affiliated Hospital of Anhui Medical University	4
2	Present situation and summary of domestic pension model	Hefei Yaohai Jing'an Yangqin Nursing Home	4
3	Carry forward the spirit of labor and cultivate new people of the times	Anhui Art Institute	4
4	Anhui Leling Art Festival	Anhui Province Modern Health Pension Research Center	4

3) Research arrangement

Through field visits, students can intuitively feel the practical application of intelligent technology in aging, which helps them to understand theoretical knowledge more deeply, By observing and analyzing real cases, students can understand how intelligent technology can improve the quality of life of the elderly, thus deepening their understanding of professional knowledge. See Table 6 for the specific research arrangement.

Table 6. Research arrangement table

Serial number	Research unit	Hours (including 2 hours of research report)
1	Zhongke (Anhui) G60 Wisdom Health Innovation Research Institute	6 hours
2	Wisdom Kangyang Service Center	6 hours
3	Anhui Sanlian Robot Technology Co., Ltd	6 hours
4	Sanqing Juyang Health Technology Co., Ltd	6 hours
5	Anhui Science and Technology Museum	6 hours
6	Anhui Sanlian Group	6 hours
7	Anhui Shengxun Information Technology Co., Ltd	6 hours
8	Anhui Sanlian Transportation Application Co., Ltd	6 hours

4) Scene training

The concept of "9073 old-age care model" is integrated into the scene teaching model, that is, 90% of the elderly are taken care of by their families, 7% enjoy community home-based old-age care services, and 3% enjoy institutional old-age care services [22-23]. Through real aging-suitable application scenarios such as home care bed, aging-suitable transformation, inter-care, meal assistance, bath assistance, cleaning assistance, emergency assistance, walking assistance and medical assistance, students can understand the application of aging-suitable scenarios, and apply theoretical knowledge to actual situations in the project, thus deepening their understanding and improving their ability to solve practical problems. Cultivate teamwork and communication skills, innovate thinking and deepen professional knowledge [20].

5) Competition arrangement

By participating in the competition, students' innovative thinking, teamwork ability and problem-solving abilities can be cultivated, and students' popularity and competitiveness in the field of intelligent technology can be enhanced at the same time. See Table 7 for the competition arrangement of specific disciplines.

Table 7. Arrangement of subject competition

Serial number	Competition name	Class hours
1	Anhui College Students Innovation Competition	3 hours
2	Anhui College Students Career Planning Competition	3 hours
3	Kangyang Intelligent Technology Competition	3 hours
4	Challenge Cup	3 hours

6) Online learning arrangements

By providing online curriculum resources, electronic teaching materials, references, etc., we can help students get in touch with the most cutting-edge academic research results and industry trends, and keep pace with the times. Cultivate students' self-management and self-discipline, and enhance their autonomous learning ability and cross-cultural communication and cooperation ability.

Assessment and Evaluation of Micro-specialty Construction

Course assessment

The examination of the micro-specialty course "Intelligent Technology Suitable for Aging Application" should include two aspects: theoretical knowledge examination and practical ability examination. Theoretical knowledge assessment mainly inspects students' mastery and understanding ability of curriculum knowledge; Practical ability assessment mainly examines students' practical ability and problem-solving ability. Curriculum assessment methods can adopt closed-book examination, open-book examination, curriculum design, experimental report and other forms.

Project practice assessment

Project practice assessment is an important means to evaluate students' practical ability and innovative abilities. In the micro-major of "Intelligent Technology Suitable for Aging Application", students need to choose or participate in actual project research or competition independently, and carry out practical operations and innovative practice. Project practice assessment should include a project plan, project progress report, project achievement display and other links to comprehensively evaluate students' practical ability and innovation abilities [14].

Comprehensive quality evaluation

In the micro-major of "Intelligent Technology Suitable for Aging Application", the evaluation of students' comprehensive quality should include learning attitude, teamwork ability, innovative thinking ability, communication and expression ability and so on. Colleges can cultivate students' comprehensive quality and ability by organizing research activities, project cooperation and competition activities, and evaluate them through students' self-evaluation, mutual evaluation and teacher evaluation [14].

CONCLUSION

The micro-specialty construction of "Intelligent Technology Suitable for Aging Application" is an important measure to meet the challenges of an aging society. Through interdisciplinary knowledge integration and practical ability training, compound talents with medical, engineering and other multi-field knowledge can be trained to provide safer, more convenient and personalized aged care services for the elderly. In the future, with the continuous development and application of intelligent technology, the micro-specialty construction of "intelligent technology suitable for aging application" will have broader development prospects and more importantly social significance. At the same time, we also need to constantly explore and innovate the modes and methods of micro-specialty construction to adapt to the changing needs and challenges of an aging society.

In the future, the Faculty of Modern Health Care Anhui Sanlian University Industry College will continue to adhere to the development concept of "integration of medical industry and management, integration of production, education and research", focusing on the cutting-edge technology and market demand of health care industry, continuously optimize the specialty setting and curriculum system, and improve the teaching quality and scientific research level. With its unique personnel training mode and high-quality educational resources, the college will attract more attention and cooperation from enterprises and institutions, and make greater contributions to the healthy development of the health care industry. At the same time, the college will continue to strengthen practical teaching, improve students' practical ability and innovative ability, and train more high-level and compound health care talents to meet the social demand for high-quality health care talents.

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