ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202507_8(7).0032

Research on the Training System of Engineering and Applied Talents in the Digital Intelligence Era

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Abstract

With the rapid development of information technology, the era of digital intelligence has arrived. As a key force to promote technological innovation and industrial upgrading, the training system of engineering and applied talents must adapt to the needs of the digital intelligence era, focusing on the application of data analysis and intelligent technology. Starting from the needs of engineering and applied talents in the digital intelligence era, this study analyzes the problems existing in the current talent training, constructs a talent training system of "mechatronic integration, resource sharing; AI empowerment, digital literacy; double guidance collaboration, pioneer leadership", and expounds the innovations, expected achievements and research foundation of the system.

Keywords

Digital intelligence era; Engineering and applied talents; Training system.

1. Introduction

With the rapid development of information technology, the era of digital intelligence has quietly arrived. As a key force to promote technological innovation and industrial upgrading, the training system of engineering and applied talents must adapt to the needs of the digital intelligence era, focusing on the application of data analysis and intelligent technology. Foreign researchers generally pay attention to the important role of practical teaching in the training of engineering and applied talents. They believe that practical teaching can enable students to combine theoretical knowledge with practical operation, so as to understand and master professional knowledge more deeply. In the research on the training system of engineering and applied talents in the digital intelligence era in China, major universities have actively explored innovations in talent training models, curriculum settings and teaching methods by combining their own advantageous disciplines. The innovative experimental zone for the "double carbon" composite talent training model of the dual degree in environmental science and accounting of Tongji University not only combines the advantageous disciplines of environmental science and accounting, but also focuses on serving the national "double carbon" strategic goal, and creates a team of composite top-notch talents that meets the needs of the national "double carbon" goal through the dual degree composite talent training model. The "AI Double Star" program for the cultivation of digital intelligence talents in East China University of Science and Technology aims to create an integrated "one core and two stars" education model for undergraduate and graduate students by deeply integrating the technologies and methods in the field of artificial intelligence.

The research on the training system of engineering and applied talents in the digital intelligence era is of great significance and value. On the one hand, by deeply studying the talent training system, we can optimize the curriculum, teaching methods and evaluation system, and improve the quality and efficiency of talent training. On the other hand, this research can provide useful

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reference for universities and enterprises, and promote the reform and innovation of the training system of engineering and applied talents. There are differences in talent training between domestic and foreign universities, so we need to deeply analyze the research gaps and reasons at home and abroad, learn from advanced experience, and combine with China's actual situation to build a more perfect training system for engineering and applied talents in the digital intelligence era.

2. Research Content

2.1. Research Object

Engineering and applied talents are the talent guarantee for China to achieve the strategic goal of a manufacturing power. At present, the engineering and applied talents trained by application-oriented undergraduate universities can hardly meet the needs of enterprises, mainly due to: insufficient interdisciplinary integration in the training of engineering talents, resulting in students' lack of innovative spirit; the curriculum setting, teaching methods, practice links and evaluation system of the talent training system are too single, and the shaping process of innovative thinking is lacking; the concept of innovative education is insufficient, and the practical application ability cannot meet the technical needs and market changes, so that students cannot improve their innovative ability. Therefore, this project carries out research from three aspects: the curriculum system, teaching mode reform and innovative education platform for the cultivation of engineering and applied talents.

2.2. Main Objectives

(1) Constructing the curriculum system of "mechatronic integration and resource sharing"

By integrating the knowledge of mechanical engineering, electronic technology and other fields, breaking the barriers between disciplines, and cultivating students' innovative spirit and comprehensive ability. Strengthen the construction of online course resources, use the network platform to collect high-quality educational resources, realize the wide sharing and flexible access of knowledge, and support students' autonomous learning and in-depth learning. At the same time, pay attention to the teaching mode of combining software and hardware, which not only emphasizes the systematic learning of theoretical knowledge, but also attaches importance to the cultivation of practical operation ability. Through laboratory construction and project practice, students can deepen their understanding in hands-on practice. In addition, we explore the teaching method of combining virtual and real, and use advanced technologies such as virtual reality and augmented reality to simulate real industrial scenes and complex mechatronic systems, so as to provide students with immersive learning experience and enhance the fun and effectiveness of learning.

(2) Implementing the teaching mode reform of "AI empowerment and digital literacy"

By introducing artificial intelligence technology, we can not only optimize the teaching content and methods, improve the teaching efficiency, but also build a diversified evaluation system with the help of big data analysis, machine learning and other means to comprehensively evaluate students' ability to solve practical engineering problems, innovative thinking and application literacy of digital technology in the digital intelligence era. This reform measure ensures that the cultivation of engineering and applied talents is highly consistent with the needs of the digital intelligence era, and provides the industry with composite talents with solid professional knowledge, good digital literacy and innovative thinking.

(3) Building an innovative education platform of "double guidance collaboration and pioneer leadership"

In this platform, counselors focus on education, helping students develop comprehensively through ideological guidance, psychological counseling and career planning; Academic tutors

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focus on talent cultivation, providing personalized academic guidance and scientific research training in combination with professional characteristics, so as to enhance students' professional skills and innovative ability. The platform also gives full play to the vanguard and exemplary role, and establishes the "three teams and three demonstrations", that is, the doctor party member tutoring team, which drives students to make progress together with the academic advantages of doctor party members; The vanguard team of double-qualified party members in competition services, led by teacher party members with enterprise practical experience, guides students to participate in various skills competitions and improve their actual combat ability; The student party member innovation and invention commando team encourages student party members to play a vanguard role, lead the team to carry out innovation projects, and stimulate innovative thinking, so as to improve the training quality of engineering and applied talents in the digital intelligence era and exercise students' innovation ability.

3. Overall Framework

Combined with the current situation of local economic development and the latest talent needs of industrial development, the research on the training system of engineering and applied talents in the digital intelligence era is constructed based on "mechatronic integration, resource sharing; AI empowerment, digital literacy; double guidance collaboration, pioneer leadership". The research and construction framework of the training system for engineering and applied talents in the digital intelligence era is shown in Figure 1.

3.1. Constructing the Curriculum System of "Mechatronic Integration and Resource Sharing"

Promote "interdisciplinary integration", build a curriculum system of "emphasizing theory + fine practice", break the traditional disciplinary boundaries, infiltrate and integrate the knowledge of mechanical engineering, electronic technology, computer science and other fields, offer interdisciplinary courses, emphasize the combination of theory and practice, and cultivate students' comprehensive ability and innovative spirit.

Introduce the "virtual-real integration" teaching mode, use virtual reality, augmented reality and other technologies to combine traditional classroom teaching with virtual experiments and simulations, create an intuitive and vivid learning environment for students, reduce experimental costs, improve experimental efficiency, stimulate students' innovative spirit, and provide more autonomous learning opportunities.

3.2. Promoting the Teaching Mode Reform of "AI Empowerment and Digital Literacy"

Construct a teaching staff of "double teacher quality, dual ability equal emphasis, double specialty integration, and comprehensive quality improvement", promote the in-depth cooperation among education, science and technology, and industry by promoting the "three integrations" of science and education integration, school-enterprise integration, and industry integration, and ensure that teachers improve their AI and digital technology literacy, so as to provide faculty Support for talent training. Build a diversified evaluation system of "multiple, timely and adjustable", pay attention to the diversification of evaluation concepts, contents and methods, the timeliness of evaluation feedback and the dynamic adjustment of the evaluation system, so as to comprehensively understand students' learning situation and ability level. Strengthen digital literacy education, incorporate digital literacy into the curriculum system, and improve students' information literacy through special courses and practical training, so that they can quickly find valuable content in the massive information and provide strong support for innovation.

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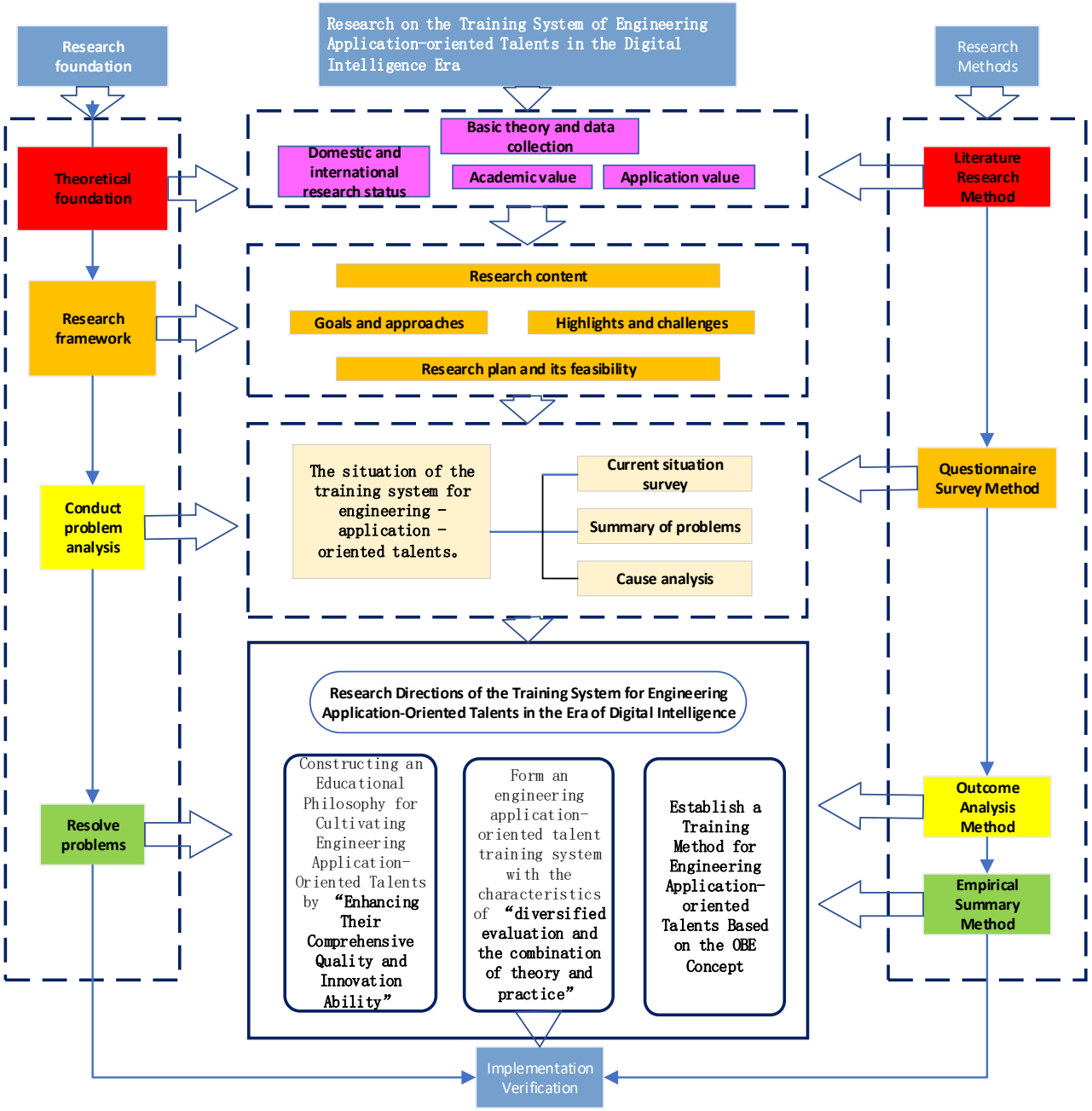

Figure 1. The research and construction framework of the training system for engineering and applied talents in the digital intelligence era

3.3. Building an Innovative Education Platform of "Double Guidance Collaboration and Pioneer Leadership"

Implement the "double guidance collaboration" mechanism, and the professional tutors and ideological and political tutors work closely together to not only provide students with professional guidance in academia, but also lead students to establish correct values and outlooks on life in ideology. Professional tutors stimulate students' scientific research interest with their profound academic attainments, while ideological and political tutors cultivate students' sense of social responsibility and mission through a variety of practical activities, and the two complement each other to promote the comprehensive development of students.

Taking the "Pioneer Leadership" plan as an opportunity, excavate and train a group of excellent students with innovative spirit and practical ability as the pioneer force on campus, who will

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play an exemplary leading role in academic research, social practice, voluntary service and other fields. By organizing innovative competitions, business incubation, social practice projects and other activities, provide students with a stage to show and challenge themselves, stimulate their innovative thinking and practical ability, and promote the communication and cooperation among students.

Strengthen the close cooperation between schools and enterprises, establish a "community of destiny" relationship with local leading enterprises, and realize the education mode of "eight commons" in school-enterprise cooperation, that is, jointly formulate talent training programs, develop curriculum and teaching resources, build training bases, implement teaching, carry out technological R&D, evaluate talent training quality, assume social responsibilities, and promote cultural inheritance and innovation.

4. Research Key Points and Difficulties

4.1. Constructing the Curriculum System and Building the Education Platform

Construct the curriculum system of "mechatronic integration and resource sharing", strengthen digital literacy and innovative ability to solve complex problems, and realize the construction of the innovative education platform of "double guidance collaboration and pioneer leadership"[4]. By integrating multi-disciplinary resources, promoting knowledge cross-integration, enabling students to master solid basic theories, skillfully use digital tools and technologies, and improve information acquisition, processing and application capabilities. In addition, the curriculum system pays attention to the cultivation of students' innovative thinking and practical operation ability, and designs a series of curriculum projects based on actual industrial needs, so that students can exercise comprehensive abilities such as critical thinking, team collaboration and project management in the process of solving complex engineering problems. This series of measures effectively realizes the precise docking of talent training objectives and industrial development needs, not only lays a solid foundation for students' future career, but also transports a large number of high-quality professional talents for industrial upgrading and innovation and development. On this basis, the curriculum system further promotes the construction of the "double guidance collaboration and pioneer leadership" innovative education platform, that is, under the joint guidance of professional tutors and ideological and political tutors, a dual guidance mechanism of academic and ideological guidance is formed, and at the same time, the vanguard and exemplary role of excellent party members is brought into play to lead and drive other students to actively participate in innovative practice activities. The construction of this platform not only provides students with more abundant practical opportunities and innovative resources, but also promotes the comprehensive improvement of students' comprehensive quality, and lays a solid foundation for cultivating innovative talents to meet the requirements of the new era.

4.2. Keeping up with the Technological Frontier, Balancing Theoretical and Practical Teaching, and Realizing the Teaching Mode Reform of "AI Empowerment and Digital Literacy" to Cultivate Innovative Talents Meeting Market Needs

Pay attention to teaching students the latest theoretical knowledge to ensure that they keep up with the pace of scientific and technological development, and emphasize that through rich practical projects, students can deepen their understanding and improve their skills. Integrate AI into all aspects of teaching, provide students with intelligent learning resources and personalized learning paths, and enhance their data processing and analysis capabilities, that is, digital literacy. In the era of digital intelligence, technology updates rapidly and market demand changes rapidly. This series of reform measures aims to cultivate composite talents

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202507_8(7).0032

with both deep theoretical foundation and excellent practical ability and high digital sensitivity, so as to better adapt to the rapidly changing market environment.

5. Innovations

5.1. Characteristics and Innovations in Academic Thoughts

(1) Characteristics of academic thoughts

The training system of engineering and applied talents in the digital intelligence era takes the curriculum system of "mechatronic integration and resource sharing" as the core, emphasizes the interdisciplinary knowledge integration, combines the knowledge and methods of mathematics, computer science, engineering and other disciplines, so as to cultivate students' comprehensive ability and innovative thinking. This characteristic of interdisciplinary integration makes talent training more comprehensive and able to cope with the needs of composite talents in the digital intelligence era. The research system pays equal attention to theory and practice, and enables students to apply the knowledge they have learned to practical problems through various ways such as intramural experiments, enterprise internships and project practices, so as to cultivate their ability to solve practical problems. Always adhere to the student-centered educational concept. Emphasize students' individual differences and needs, and provide more accurate and personalized training programs through personalized teaching, tutorial system and other means.

(2) Innovation of academic thoughts

The research system actively introduces cutting-edge technologies such as artificial intelligence, big data and cloud computing, and integrates them into the curriculum system and teaching methods by using AI empowerment. The introduction of these technologies not only enriches the teaching content, but also improves the teaching effect and students' learning experience[3]. Build an intelligent teaching platform by using modern information technology to realize the sharing and optimal configuration of teaching resources. Through intelligent teaching systems, online learning platforms and other tools, provide students with more convenient and efficient learning methods. The research on the training system of engineering and applied talents in the digital intelligence era emphasizes the education mode of industry-university-research integration, and realizes the deep integration of education, scientific research and industry by cooperating with enterprises, scientific research institutions and other institutions to establish internship training bases, joint R&D centers and other institutions. This integrated education mode is not only helpful to improve students' practical ability and innovation ability, but also helpful to promote scientific and technological progress and industrial development. Adopt diversified evaluation methods, including curriculum assessment, project evaluation, practice report, etc., to comprehensively evaluate students' learning achievements and comprehensive abilities. At the same time, the combination of process evaluation and final evaluation is also introduced to more accurately reflect students' learning process and effects.

5.2. Characteristics and Innovations of Academic Views in This Project

(1) Characteristics of academic views

Under the background of the digital intelligence era, academic views generally believe that the cultivation of engineering and applied talents should be closely focused on the development trend of digital intelligence technology, strengthen the deep integration of digital intelligence technology and engineering applications, and integrate digital intelligence technology into the whole process of engineering education, so as to cultivate composite talents with digital intelligence thinking, digital intelligence skills and digital intelligence literacy. Practical ability is one of the core abilities of engineering and applied talents[1]. Academic views generally believe that students' practical ability and problem-solving ability should be improved by

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strengthening practical teaching and carrying out school-enterprise cooperation. At the same time, innovative ability is also an important requirement for talents in the digital intelligence era, so practical ability and innovative ability should be paid attention to.

(2) Innovation of academic views

Under the background of the digital intelligence era, the digital transformation of education has moved towards the digital intelligence transformation. Academic views innovatively put forward the educational concept of digital intelligence transformation, emphasizing the combination of human intelligence and machine intelligence, and emphasizing the subjective initiative and dominant position of human in human-machine collaboration[2]. This concept provides a new idea and direction for the cultivation of engineering and applied talents. In terms of the innovation of talent training mode, academic views have built an innovative education platform of "double guidance collaboration and pioneer leadership", which forms a dual guidance mechanism of academic and ideological guidance, and exercises students' lifelong learning ability, information processing ability, innovative practice ability, etc. These abilities are very important for engineering and applied talents in the digital intelligence era. With the continuous development of digital intelligence technology, its application in the field of education is becoming more and more extensive. Academic views innovatively put forward the idea of using digital intelligence technology to optimize the talent training process. For example, by building a digital intelligence education practice innovation platform, using cloud computing technology to provide students with experimental computing environment and computing power, and supporting students' personalized and diversified learning; By adopting teaching models such as "flipped classroom", fully mobilize students' subjective learning initiative; By improving the library collection of the school, teachers' classroom sharing and other forms, stimulate students' learning of cutting-edge theories.

6. Conclusion

As a typical application-oriented undergraduate college, Wuhan Donghu College is based in Wuhan, faces Hubei and radiates the whole country, and cultivates talents with ideological and political quality, scientific and humanistic quality, physical and psychological quality as the "body", and practical ability and innovative spirit as the "two wings". Combined with the current situation of local economic development and the latest talent needs of industrial development, the research on the training system of engineering and applied talents in the digital intelligence era based on "mechatronic integration, resource sharing; AI empowerment, digital literacy; double guidance collaboration, pioneer leadership" has strong practical application significance, and can provide reference for the talent training of other similar universities and industries. The previous core views of the research on the training system of engineering and applied talents in the digital intelligence era mainly focus on three aspects: the curriculum system, teaching mode reform and innovative education platform for the cultivation of engineering and applied talents. These core views provide important theoretical support and practical guidance for constructing the talent training system to meet the needs of the digital intelligence era.

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