Exploration and Research on Industry-Education Integration of Vocational Education in AI Era

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Abstract: With the wave of artificial intelligence sweeping the world, Artificial Intelligence technology has penetrated all walks of life and had a profound impact on various industries and Vocational Education. This paper analyzed in detail the impact of artificial intelligence on the three industries and the impact on vocational education on the basis of defining the characteristics of the era of artificial intelligence. Then, it expounded the necessity, significance and problems of the mechanism of "Industry-Education Integration" in the new era. Finally, a new path for deepening the development of "Industry-Education Integration" in the artificial intelligence era was given from the macro, medium and micro levels.

1. Introduction

Artificial intelligence (hereinafter referred to as AI) will be widely used in all walks of life and become a new force in the world's scientific and technological revolution because of its ability to "imitate people". The characteristics of the era of AI will be gradually clear, and the coexistence of human and machine will be the general trend. With the deep integration of artificial intelligence and traditional industries and the implementation of technologies, new technologies, new industries and new formats will inevitably emerge, which will have a subversive impact on the social economy. At the same time, more and more complex talents will be needed in the labor market [1].

China's national policy stipulates that vocational education should meet the development trend of science and technology and market demand, improve the vocational education and training system, so as to better serve the needs of building a modern economic system and achieving higher quality and fuller employment. It can be seen that vocational education, as the "bridge" between talents and industry, should first make changes to adapt to the development of the new era [2].

2. Characteristics of "AI Era"

With the wide application of new technologies such as machine learning, knowledge atlas and computer vision, AI technology has gradually penetrated into all walks of life and brought subversive effects. However, there is still no unified definition of what is artificial intelligence and the artificial intelligence era. In a word, AI is to construct a system with certain human like functions by studying

the laws of human intelligence activities, so as to complete the work that requires human intelligence to be competent in the past. Therefore, the subject of AI involves computer science, psychology, philosophy, linguistic information theory, cybernetics, medicine and other disciplines, which studies knowledge representation, automatic reasoning, machine learning, knowledge acquisition and knowledge processing systems, natural language understanding, computer vision, intelligent robots, automatic programming, etc [3-4].

A period called "X + era" must have experienced unprecedented technological changes, brought universal influence and significance, and become the symbol of this period, such as "steam age" and "information age". Based on information technology and digital technology, AI has been widely used in economic and political decision-making, industrial production, agricultural planting, etc., and will change the traditional social structure and life style, thus promoting mankind to move towards the "AI Era" and achieving a new social form. The characteristics of the AI Era are mainly reflected in the following aspects: first, resource allocation permeates all fields of social life in many ways, such as people flow, logistics, financial flow, and scientific and technological flow. The efficiency of resource allocation depends on the composition of demand side, supply side, investor and stakeholders; Second, intellectual capital has become the core element of the industry in the new era, replacing land, labor capital and monetary capital to occupy the high end of the value chain; Third, the sharing economy constitutes a new form of social organization, especially resource sharing makes a large number of idle resources re-transmission in society and realize value. Finally, the platform has become a symbol of the social level which adopts the form of diversified participation to discuss solutions and build a resource sharing channel to reduce transaction costs and improve efficiency [5-6].

3. Industrial Changes in "AI Era"

As a general technology, AI affects the industrial structure in two ways: AI industrialization and industrial AI. The industrialization of AI refers that the technology-based companies of artificial intelligence grasp certain AI technologies and implement specific scenarios of industrialization. For example, famous AI companies such as IFLYTEK and Kuangshi technology have taken this path. Industrial AI means that companies in a certain segment industry, especially large-scale enterprises, take the initiative to introduce artificial intelligence technology to complete the upgrading. For example, Ping An insurance, SF express and other large-scale enterprises in subdivided fields have their own industrial upgrading [7].

Obviously, both the industrialization of AI and industrial AI are powerful drivers of the digital economy era where the digital transformation of the world economy is also the general trend. In particular, in the post epidemic era, the normalization of epidemic prevention and control objectively promotes the development of "contactless economy", which forces enterprises to carry out online business and deploy digital software and hardware facilities. As an important infrastructure, key technology, leading industry and enabling engine in the digital economy era, AI will become the core driving engine for China's industrial transformation and upgrading and the development of the digital economy [8].

With the arrival of the third artificial intelligence wave, AI has brought extensive and profound impact on agriculture, industry and service industry by virtue of its powerful enabling characteristics, as shown in Table 1.

It can be seen that the wide application of AI can not only deeply integrate with traditional industries, trigger the optimization and upgrading of industrial structure, but also create new industries and new models, thus having a profound impact on the layout of the three industries. The rapid development of AI technology objectively requires enterprises to optimize and upgrade

production equipment, labor technology level, resource allocation and other aspects. It is difficult to give full play to the enabling function of artificial intelligence technology by relying on the unilateral innovation and transformation of enterprises. It needs to be deeply integrated with universities, scientific research institutes and other scientific research institutions to promote common prosperity and promote common development. Only in this way can enterprises get out of difficulties and promote high-quality development of enterprises.

Table 1: The influence of AI technology on the three industries

Three industries	Technical means	Influence mechanism
AI+ Agriculture	Internet of things + smart terminal Big data+ smart terminal cloud computing+ smart terminal	(1) Build precision and intelligent agriculture with accurate perception, accurate control and intelligent analysis and decision (2) Use advanced production equipment such as drones to implement precision agricultural production and labor, and use big data to accurately predict natural disasters and realize safe and intelligent agriculture
AI+ Industry	Big data+ smart terminal cloud computing+ smart terminal Augmented reality+ smart terminal virtual reality+ smart terminal	(1) Use advanced technologies such as machine learning and deep learning to accurately plan and configure production resources, and use intelligent equipment such as robots and mechanical arms to replace labor to improve manufacturing efficiency and reduce labor costs. (2) Direct the production of physical system through digital system, promote the transformation from "machine based factory" to "human-machine cooperation based factory", and promote the supply side structural reform of the industry
AI+ tertiary industry	Voice recognition + artificial intelligence products. Computer vision + artificial intelligence products. Knowledge map + artificial intelligence products.	AI enables life service industries such as personal home and clothing, and productive service industries such as medical care, finance and law to accelerate service response speed, improve service quality, reduce service cost and improve service efficiency.

4. Analysis of the Influence of AI Technology on Vocational Education

As a bridge connecting the labor market and the employment needs of enterprises, vocational education is an educational activity that provides comprehensive quality training such as professional ethics, scientific culture and professional skills required by the professional development for the educated. Therefore, vocational education must respond to the dynamic changes in the demand for skilled personnel timely. With the disruptive changes of AI technology to traditional industries, vocational education should also respond to the demand for talent training to upgrade skills and cultivate high-end composite skills for the educated to adapt to the intelligent era. The impact of AI on vocational education is reflected in two aspects: first, the timeliness of the curriculum content and professional knowledge and skills of vocational education; The second is the innovation of learning mode and teaching means.

AI technology represented by virtual reality, big data, machine learning, Internet of things, etc. is imperceptibly affecting all walks of life, presenting a strong "background technology" feature. In order to enable technical and skilled personnel to have high-end composite skills such as human-computer cooperation skills, professional skills and intelligent skills and to be competent for more intelligent work activities, vocational education needs to change the training plan, specialty setting,

curriculum outline, curriculum content and teaching form according to the characteristics of the times. In addition to mastering basic technical knowledge and skills, students are also required to have knowledge transfer ability, innovative and entrepreneurial thinking and professional spirit.

On the other hand, with the support of intelligent technology, the teaching form, learning mode and teaching means in the teaching process will undergo subversive changes. Intelligent technologies such as neural network technology, expert system and machine learning can construct personalized teaching situations to meet the characteristics and needs of every student to the maximum extent. Massive curriculum resources and personalized curriculum models help students to move from passive learning to active innovation and creation; Intelligent technologies such as big data, virtual reality and augmented reality also make it possible for teachers and students to interact "from static to dynamic, from offline to online, and from virtual to reality" [9].

Under the new era background, "AI + education" shows the strong technical tension to transform traditional classroom teaching, but also faces unprecedented educational crisis, including teacher-student role crisis, teacher ability crisis, teaching quality and evaluation crisis. These crises all require deep cooperation with industries and enterprises, and the establishment of a "cooperation mechanism" of industry sharing and joint construction and talent training. Only in this way the shortcomings of the current vocational education practice conditions can be effectively made up.

5. Exploration on the IEI Path in the AI Era

"Industry-Education Integration" (hereinafter referred to as IEI) refers to a series of mutual support and promotion of in-depth cooperation between educational institutions to improve the quality of their talent training and social industries to optimize the structure and achieve high-quality innovation and development. In the new era, social industry and vocational education are impacted and affected by artificial intelligence technology, facing unprecedented challenges. As different departments in the social reproduction chain, education and industry have different social responsibilities and functions. Thus, establishing a cooperation mechanism of IEI is an urgent requirement for the high-quality development of the industry and an effective way for vocational education to cultivate compound talents. Under the background of AI Era, the connotation of IEI lies in taking the development needs of regional digital economy as the guide, taking data elements as the core, and taking artificial intelligence technology as the means, through building an effective interactive platform for IEI, forming a highly coupled and mutually promoting integration entity of industry and education, and promoting the coordinated development of regional industrial system and education system.

5.1 Perfecting and Optimizing the Macro Path of IEI

The comprehensive deepening of IEI cannot be separated from the support of relevant policies. If the national and regional policy incentives are not in place, it is easy to cause enterprises to participate less actively. From 2013 to 2021, China issued more than 100 policies at the national level to promote IEI, which covers instructions, notices, opinions, decisions, laws and other types. Although there are different types of policies and many provisions, most of them are strategic and guiding policies, with strong macro guidelines, few specific policies and weak practical operability. In addition, the release of relevant policies is dominated by the Ministry of education, and the functions of other departments have not been fully played. At the same time, there is no effective supervision mechanism, and it is difficult to really play the role of policies.

The incentive policies for IEI introduced by various localities have been supported from the aspects of finance, land, finance and credit, on the basis of the general implementation of the "tax credit policy for education surcharges and local education surcharges for pilot enterprises". However, there are still deficiencies in the design of both national and local policies. For example, enterprises

are encouraged to invest in "hardware elements" such as capital and facilities, while the investment in "software elements" such as technology, knowledge and management cannot be reasonably counted; It attaches importance to the resource input of relevant subjects, but lacks the corresponding inspection and evaluation mechanism for the effect of IEI [10-11]. The improvement and optimization path of relevant national and local policies in the AI Era is shown in Figure 1.
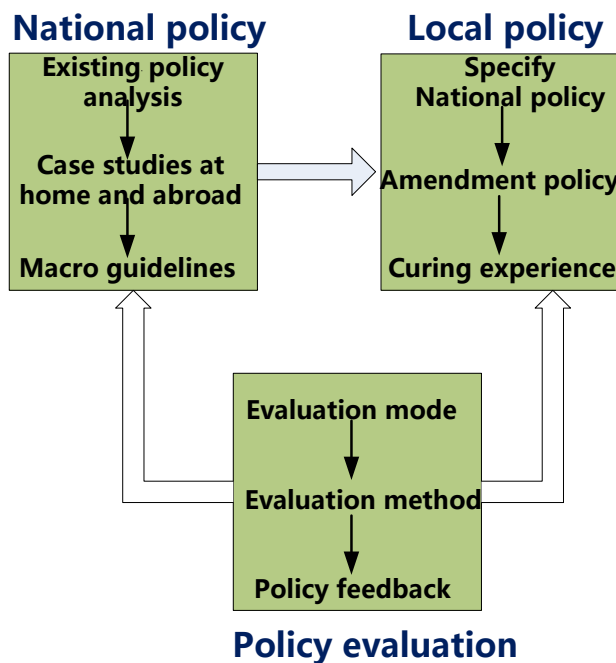

Figure 1: Macro path of "Integration of Industry and Education"

5.2 The Medium path of IEI in the AI Era

The modern industry college is directly driven by the relevant national policies. It is oriented to the industrial frontier or frontier industries. It is jointly set up by universities and industrial enterprises. Through the full co construction and sharing of material, information, knowledge, talent and technology resources, it is a mixed school entity that integrates professional teaching, scientific and technological research and development, enterprise service, innovation and entrepreneurship and other comprehensive functions. It is a new mechanism and new mode of industry, education, finance, integration and collaborative education. Compared with the traditional industry college, the "Modernity" of the modern industry college is reflected in "the new industry generated in the process of industrialization, urbanization, informatization and internationalization", "cultivating high-quality application-oriented, compound and innovative talents that meet the needs of high-quality industrial development and innovation", "the innovation mechanism of enterprises participating in the whole process of talent training and Universities Participating in all processes of enterprise operation".

In the AI Era, in order to cultivate compound, high-quality and innovative talents who adapt to and lead the development of modern industry, it is an inevitable requirement to establish a modern industrial college for higher education to support the high-quality development of economy, which is jointly built, managed and shared by local governments, industrial enterprises and other entities. As a new mode and platform for deep cooperation between schools and enterprises, modern industrial college has many problems to be solved [12-13]. In order to further improve the "IEI mechanism" and implement the practice platform of "deepening IEI", the specific medium path is shown in Figure 2
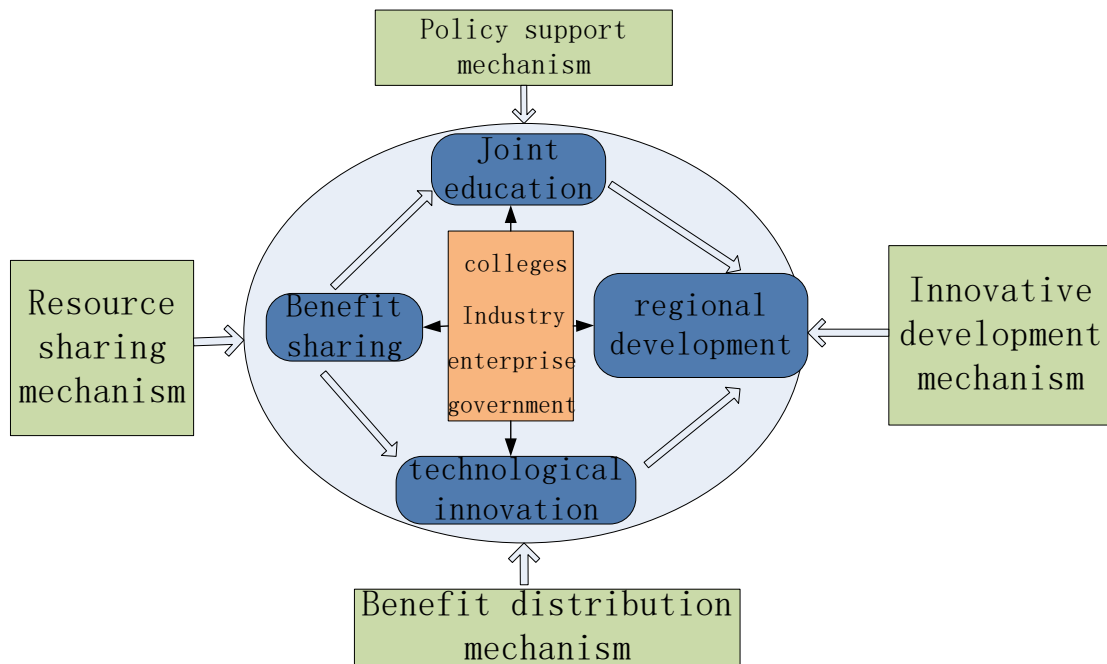
Figure 2: The medium path of "Integration of Industry and Education"

5.3 The Micro path of "Deepening IEI" in the AI Era

After the industry, enterprises and universities establish a cooperation platform and mechanism suitable for the AI Era based on the platform of "modern industrial college", the specific issues such as talent training, talent practice and teaching quality need to be further considered. Based on the modern industrial college, this paper further constructs the micro path of implementing IEI, as shown in Figure 3.
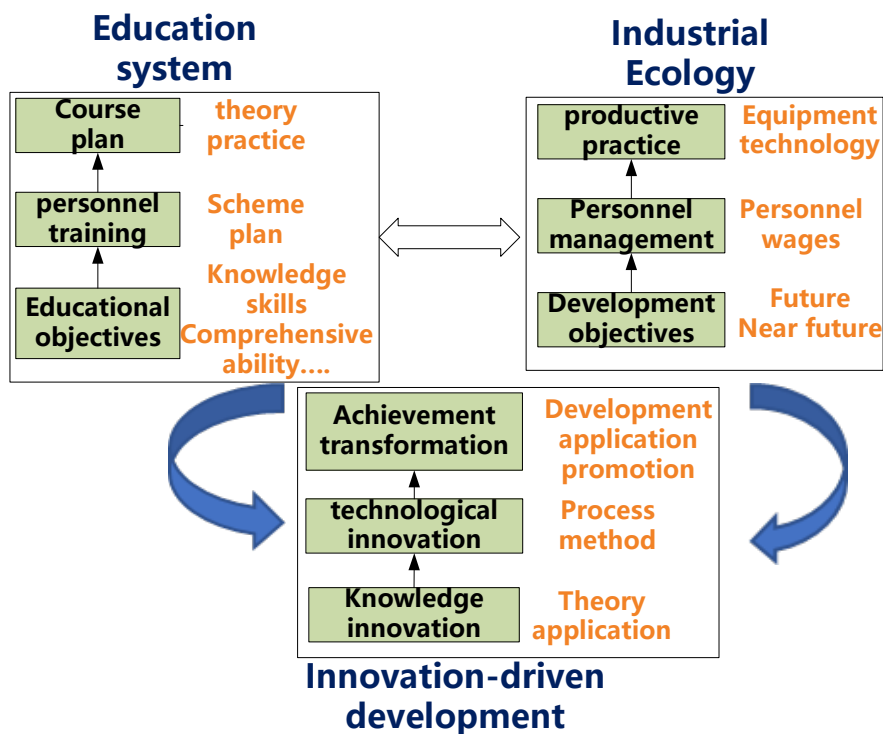

Figure 3: The micro path of "Integration of Industry and Education"

6. Conclusions

AI has become a force that can not be ignored in the whole industry. While affecting the traditional industrial chain, it also needs to reshape the education and education ecosystem to further promote technology research and application. It is an urgent requirement for the high-quality development of the industry and an effective means for vocational education to train talents to meet the market demand of the new era to establish a win-win IEI mechanism through cooperation among industries, enterprises and universities. The traditional mode and IEI mechanism still have shortcomings such as insufficient policy incentives, insufficient enterprise enthusiasm, and uneven distribution of interests. So, the AI Era needs a new path suitable for the development of social digital economy. This paper analyzes in detail the specific path of the IEI mechanism in the artificial intelligence era from the three levels of macro policy path, medium cooperation mechanism path and micro implementation path, which has important theoretical significance and practical value.

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